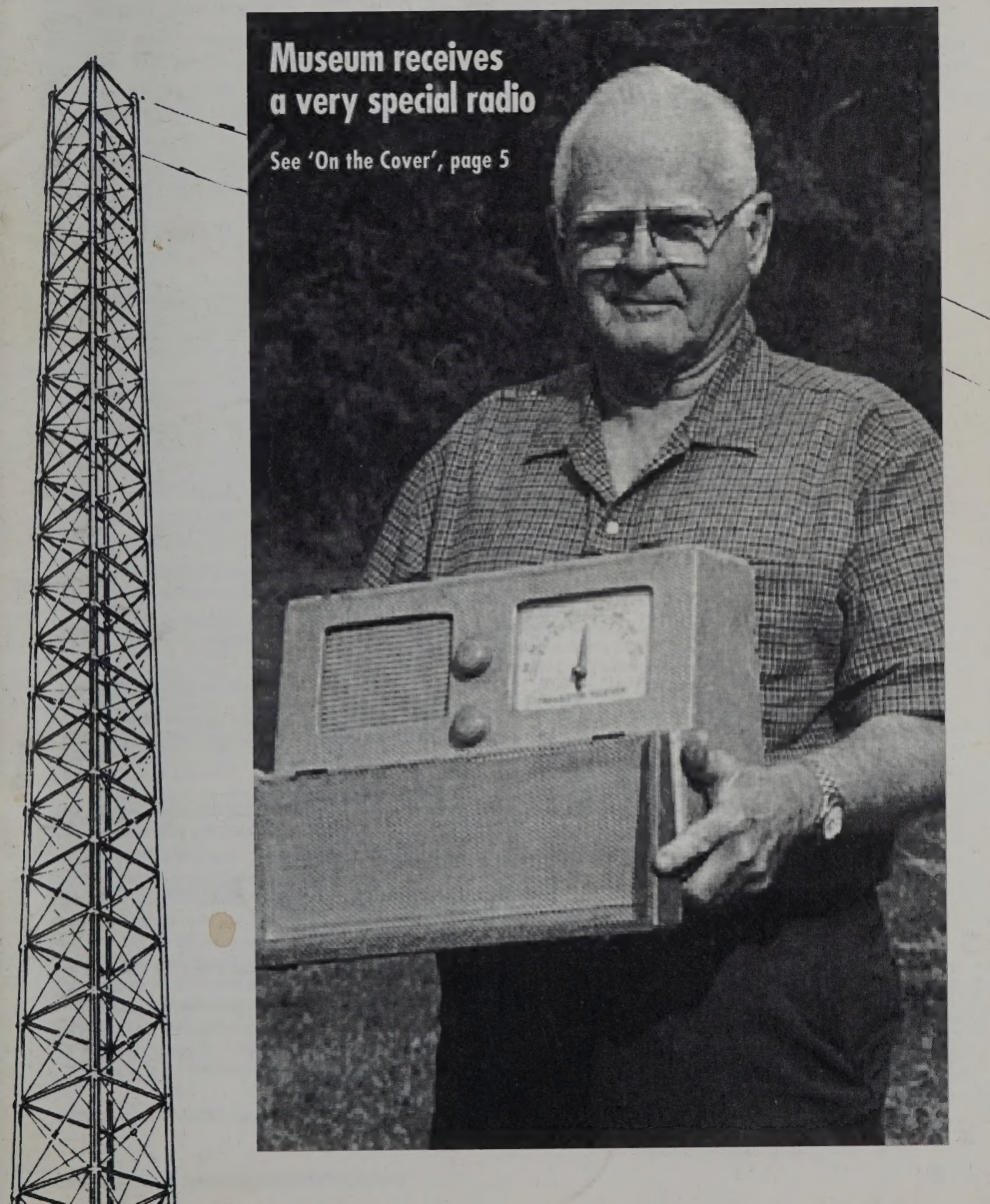
THE OTB

THE OLD TIMER'S BULLETIN FEBRUARY 2002 VOL. 43 / #1

OFFICIAL JOURNAL OF THE ANTIQUE WIRELESS ASSOCIATION, INC.

Published for the collector, historian and old-time radio operator



Museum receives a very special radio

See 'On the Cover', page 5

THE OLD TIMER'S BULLETIN

OFFICIAL JOURNAL, ANTIQUE WIRELESS ASSOCIATION, INC.
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ANTIQUE WIRELESS ASSOCIATION, INC.
BOX E, BREESPORT, NEW YORK 14816

The Old Timer's Bulletin is published approximately four times a year by and for members of the Antique Wireless Association, Inc. AWA is a nonprofit historical society founded in 1952 and chartered by the State of New York. *The Old Timer's Bulletin* is available through AWA membership. Its issuance is subject to change from time to time as to frequency, content, and size. It is not liable in any way for any buying-and-selling transaction entered into as a result of its content.

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CONTENTS

FEATURE ARTICLES

24 **A Structured Approach to Fixing Up Those Nice Old Radios** ..... **Bill Fizette, W2DGB**
Part 8—Fixing up a National NC-44.

29 **A 1929 Amateur Radio Station for the New Millenium** ..... **Edward P. Swynar, VE3CUI**
Part 2—A final amplifier for the 1929 Hartley.

34 **Selected Contest First Prize Winners** ..... **Staff**
Held over from our November issue.

36 **The Marconi Wireless Installation in the R.M.S. Titanic** ..... **Parks Stephenson**
Part 2 — Including preliminary report on latest video exploration.

49 **An Absolutely Anonymous One-Tube Receiver** ..... **Richard A. Parks**
Can anyone help identify this cute litte rascal?

56 **Building A 1929 State-of-the-Art Superheterodyne** ..... **T. J. Lindsay**
What a dedicated 1929 experimenter might have put together had he done a thorough literature search.

66 **Fr. Landell de Moura: Brazil's Wireless Telephony Pioneer** ..... **James P. Rybak, W0KSD**
His innovative wireless experiments may have preceded Marconi's.

COLUMNS

16 **The Communications Receiver** ..... **William Fizette, W2DGB**
Those National AC-DC Receivers

18 **Mics and Men** ..... **George A. Freeman**
The Mic: 1917 Western Electric (Model D 14293); The Woman: Janet Dell Freeman

19 **Below 535** ..... **Frank J. Lotito, K3DZ**
A Historical Review of Continuous Wave Radio Frequency Power Generators

23 **The Vacuum Tube** ..... **Ludwell A. Sibley**
Western Electric and the "ST" Bulb

27 **Breadboarding** ..... **Richard A. Parks**
Super-Regenerative Detectors Part II

40 **Equipment Restoration** ..... **Ken Owens**
Gems from Back Issues of The OTB

42 **Key and Telegraph** ..... **John Casale, W2Ni**
Bunnell vs. Bunnell

46 **Amateur Radio** ..... **John F. Rollins, W1FPZ**
1929 QSO Party Results; Annual OT DX Contest Announcement by Randy Haus, KB2PLW

52 **Recent Radio, TV and Entertainment Obituaries** ..... **Charles S. Griffen, W1GYR**

54 **On the Internet** ..... **Chuck Schwark**
Military Sets and Mil Surplus on the Web

62 **Television** ..... **Richard Brewster**
Ken McIntosh—TV Historian

63 **New Books and Literature** ..... **David W. Kraeuter**

DEPARTMENTS/CLUB NEWS

4 President's Message
4 Letters to the Editor
5 On the Cover
6 AWA News
13 Museum News
51 About Our Authors
51 Silent Keys
70 Classified Ads
73 Business Card Ads
75 Museum Store
76 Museum Store Order Form

THE PRESIDENT'S MESSAGE

A milestone was passed at the Board meeting in November, when with the completion and formalization of the new management team at the Museum, the way was cleared for us to formally apply to the State of New York for a Permanent Charter. This reorganization was made necessary because of the rules and regulations of the State of New York governing not-for-profit corporations, which, of course, is what our Museum is. As soon as this action was completed by the Board, and the new Board of Trustees had met for the first time, the application for the Permanent Charter was completed by our Curator, Ed Gable, and mailed to Albany.

Ed Gable, who was first introduced to the AWA and Bruce Kelley when he was a lad in grade school, is well known to most members and needs no further introduction here. Our new Museum Director is Tom Peterson, an AWA Board member for several years, who is also on the finance committee, and who brings to the job a long experience with museums. These two gentlemen, along with a group of hard-working volunteers, constitute a superb and dedicated team which promises to continue and expand on the excellent work that has already been going on. The thanks and well wishes of all the AWA members go out to this group, who collectively put in long hours to keep the AWA Museum a world-class institution.

The new Treasurer of the AWA is Randy Haus, who has been quietly volunteering for numerous jobs for several years. He is by vocation the Undersheriff of Tompkins County, NY, a position that entails working with large budgets. Stan Avery is now the Treasurer of the new Museum Board. Other changes in the respective boards will be found elsewhere in this issue.

Just in case there is a question in the minds of some members, what was accomplished was nothing more than a formalization and completion of a process that has been going on for some years, the recognition that the AWA Museum has its own management team as well as its own financial structure to go along with its distinctive corporate identity. The Museum is still an integral conceptual part of the Antique Wireless Association, and is supported by the members and officers of the AWA. To support this, there is an overlap of board members, with some people serving on both. Contact information for these board members will be published periodically, and if any member has any questions he is free to contact anyone on the lists.

In closing, there has been a great deal of interest in the Annual Conference since the abrupt change in ownership of the headquarters hotel, the Rochester Marriott Thruway, last fall just before the meet. Our new Conference chairman is AWA Board Member Hugh Davey, who is taking over from Bruce Roloson, who has done so much over the years to make the Conference a success. Hugh will bring you up to date on the 2002 meet elsewhere in this issue of *The OTB*. We wish him all the best and every success as he takes over this challenging job.

LETTERS TO THE EDITOR

All letters to the Editor are read with interest and attention, though not all can be published in this column. Letters may be paraphrased, shortened or otherwise edited to fit the available space. The statements made by our correspondents are their own opinions and do not necessarily reflect the views of either the OTB *staff or the Antique Wireless Association.*

SUPER-REGEN STORY

Richard A. Park's story about the super-regenerative detector in the FEBRUARY 2002 issue of *The OTB* reminded me of the self-quenched super-regenerative detector I cobbled together from junk box parts in 1952. I had just read an article about such a circuit and decided to see for myself whether it could perform as well as the writer said it could. The junk box yielded a 6AC7, which fit in with the writer's claim that the higher the transconductance the better, but no construction details were given.

By choosing the grid circuit time constant, the blocking or quench rate was established at about 10 kHz. This made a fine tuning indicator because, when no carrier was received, the quench was heard as a loud squeal in the phones; with a

carrier, or even local oscillator radiation from neighbors' receivers, the detector locked on and the squeal was silenced.

The set operated in the AM broadcast band; voice and even country music came through nicely. It seemed to outperform my Hallicrafters in pulling in distant stations, just as the Parks claimed. I considered rebuilding it properly, with good shielding and an RF amplifier to minimize radiated interference. However, I've never returned to the project.

CLAUDE J. DELLEVAR, JR.
Sylmar, CA

SUPERHETERODYNE RESEARCHER

I'd like to officially announce my research into the various manufacturers of broadcast-band superheterodyne receivers from 1918 to 1930. My goal is the publication of a book specifically designed as an identification guide. It will contain pertinent information and pictures from ads and articles from periodicals of the day, displayed in such a way as to aid the collector in recognizing the manufacturer of an unidentified radio. In-depth technical discussions will be left for, possibly, a later publication. To date, I've databased over 425 brands and models advertised before 1930! Anyone who has history about a specific manufacturer or has information or pictures of an obscure superhet is encouraged to contact me. The publication, "Superheterodyne, The Rolls Royce of Reception," is scheduled for late Spring 2002.

RICK AMMON
2518 Wyandotte Drive
Fort Collins, CO 80526
oldradios2@home.com

THANKS FOR BK AWARD

I would like to thank the AWA for the 2001 Bruce Kelley Award. Receiving it certainly was a complete and pleasant surprise. It is an unfortunate sign of the times that I was a bit leery of opening this unexpected package from a strange address in another country!

Frank Lotito deserves credit for encouraging me to write the two-part article on Marconi's transatlantic stations in Nova Scotia for his "Below 535" column. Investigating both the historical and theoretical aspects of the low frequency wireless systems of Tesla and Marconi continues to be an interesting hobby.

The centennial this year of the first transatlantic radio signal received at Newfoundland and the centennial next year of the first transatlantic wireless telegraph messages transmitted from Glace Bay, Nova Scotia have generated some local interest in Marconi. I have put a brief history of the Newfoundland event on the web site <http://www3.ns.sympatico.ca/henry.bradford/marconi-newf.html>, and I hope to put a fuller account of the Cape Breton stations, together with many photos gathering dust in my files, on a future web site.

HENRY M. BRADFORD
Wolfville, N.S., Canada

SOUNDER DEMONSTRATOR

I have developed a device that brings old telegraph sounders to life. It contains a capacitive touch switch and a custom integrated circuit that sends a Morse code message to the sounder whenever anyone touches any part of the sounder body. Embedded in a nice wooden base, with the sounder mounted on top, it makes a great showpiece or paperweight.

See my web page <http://web1.greatbasin.net/~muellerpage/main.htm> for free plans. I offer the chip and circuit board at a low cost. If you love telegraph, I'm sure you'll love this project!

MARTIN MUELLER
mmueller@gbis.com

ON THE COVER

So what's so special about the radio Jim Troe is holding on the cover? It looks a fairly routine 1940s portable, maybe an early Zenith. But look closer! You've never seen this model before. That's because it was put together by Bell Labs, and is the world's first transistor portable, dating from 1951. It was developed to show the practicality of the concept. Jim donated the set to the museum along with the world's first cellular telephone.

This issue of *The OTB* is so crowded with special member information that we had to leave out Museum Curator Ed Gable's article dealing with Jim's gifts and some other very important museum contributions. Look for it next time. And to save as much space as possible for more important things, these will be the only Editor's remarks I'll print right now.—*mfe*

AWA NEWS

***OTB* POLICY ON PROMOTING EVENTS:** The *OTB* is pleased to list the meets and meetings of any established antique radio organization, whether or not it is associated with the AWA. Do not send your information directly to the *OTB* Editor. Please send it to Joyce Peckham, Box E, Breesport, NY 14816. Closing date is six weeks prior to first day of month of issue.

Calendar of AWA Activities

February 3
NARC Winter Workshop and Swap Meet

March 21-23
CC-AWA "Spring Meet in the Carolinas"

May 4
AWA Spring Meet

May 4
Semi-Annual Board Meeting

May 17-18
Radio Daze 2002

August 28-31
AWA Annual Conference

Calendar of Meets

(AWA logo identifies AWA-sponsored events)

NARC WINTER WORKSHOP AND SWAP MEET

February 3

Sponsored by the Northland Antique Radio Club. At Pavek Museum of Broadcasting, 3515 Raleigh Avenue, St. Louis Park, MN. For more information: Call Steve Raymer at (952) 926-8198, or visit the NARC Web site at www.geocities.com/TelevisionCity/4544/

SPRING MEET IN THE CAROLINAS

March 21-23, 2002

Sponsored by AWA Carolinas At Sheraton Charlotte Airport Hotel, Charlotte, NC. See "With the Chapters" box in this section. For more info: contact Ron Lawrence, 704-389-1166, POB 3015, Matthews, NC 28106, or visit cc-awa.org.

AWA SPRING MEET

May 4

Dawn to noon flea market, annex surplus and junque sale this year featuring audio/hi fi equipment, annex tour, indoor space for informal or group meetings with coffee and snacks available. Like many other meets, we've had to streamline our event schedule; the luncheon and after-lunch auction have been eliminated (see "Museum News" column). Admission free, seller's fee $3.00. Location: AWA Annex building, 6910 Rt. 5 & 20 (intersection with Rt. 444), Bloomfield, NY—on the grounds of the American Legion Post. Questions to Ed Gable, Museum Curator, at (716) 392-3088 or k2mp@eznet.net.

RADIO-ACTIVITY 2002

May 16-18

Sponsored by the Mid-Atlantic Radio Club. Please note the dates! In an effort to find cooler weather, the meet is being held one month earlier than previous years. But expect to find the same great line up of events such as the big flea market, old equipment contest, radio seminars, awards banquet, and auctions. The meet will be at the same location as last year, the Sheraton College Park in Beltsville, MD, conveniently located between Baltimore and Washington, DC at I-95 exit 29B, at the southwest corner of the interchange. For further info, contact Brian Belanger at 5730 Avery Park Dr., Rockville, MD 20855-1738, (301) 258-0708, or visit http://www.maarc.org for details and updates.

RADIO DAZE 2002

May 17-18

Sponsored by the Northland Antique Radio Club. At Comfort Inn of Plymouth, 3000 Harbor Lane, Plymouth, MN. Swap Meet-Auction-Contest-Garage Sale-Program-Luncheon. For more information: Contact Jim Thompson (612) 822-4000, Kip Wallace (952) 544-2547, NARC, P.O. Box 18362, Minneapolis, MN. 55418, or see NARC web site: www.geocities.com/TelevisionCity/4544/

AWA ANNUAL CONFERENCE

August 28-31

New Chairman, Old Locale: A Message from Hugh Davey

Well, now that the holidays are past, you may again be wondering "What about the 2002 AWA Convention?"

If you weren't at the Convention Banquet last September, you may not know that Bruce Roloson has retired as Conference Chairman. Bruce has performed his magic behind the scenes for many years, insuring that all the events at the conference run smoothly. Beginning with this conference, I will succeed Bruce as Chairman. But I'm very fortunate to have Bruce's advice as

near as the telephone.

If you'd like a little background on me, I began collecting when, about age 10, I started to notice discarded radios perched atop neighborhood trash pails. My wife and I continue to collect radios and related effluvia, primarily from the 30s deco era. I'm a ham (N2XBC), was first licensed in 1963, and have spent 30 years with the Bell system and AT&T.

As you all know, the last minute gifting of the Thruway Marriott to Rochester Institute of Technology, just as our 2001 Conference was about to begin, caused considerable confusion and some inconvenience. It was the topic of conversation for some time afterward. Since then, scouting for alternative locations, I have visited several other conference centers.

I looked at the number and size of the conference rooms, the size of the parking lot available for our flea market, the availability of convenient overflow accommodations, and the proximity to the AWA Museum. I found no location that met these requirements as well as the former Thruway Marriott.

RIT now operates the facility as a conference center in addition to using it for student housing. By scheduling our conference just a bit earlier, we avoid the students and RIT will be able to

AWA, INC. MEMBERSHIP MEETING

Meeting was held at the RIT Inn & Conference Center, Rochester, NY on November 11, 2001 at 11:15 AM EST. Present were 17 directors, the acting recording secretary Pat Muehlbauer, and 5 members.

Membership report showed membership as follows: US 3,386; Canadian 160; Foreign 130. Lifetime memberships 18. At the conference 58 new members joined.

The nominating committee report was given by Ron Frisbie:

1. 766 proxies were received, plus five by voice vote. Results: To set at 18 the number of directors of the Antique Wireless Association, Inc and at 12 the number of trustees of the AWA Electronic Communications Museum, in accordance with the statutes of the State of New York governing Not For Profit Corporations and Chartered Museums. Vote was 758 For, 4 Against, 9 Abstain. Motion to accept report was made and carried.

2. To elect the following nominees to be directors of the AWA Inc in the class whose term expires in 2004. Brian Belanger, William Fizette, Randolph Haus, Lauren Peckham, Tom Peterson, Bruce Roloson. Vote was 758 For, 3 Against, 10 Abstain. Motion to accept made and carried.

The membership meeting adjourned at 11:40 AM EST.

AWA INC. BOARD OF DIRECTORS MEETING

Meeting held at same location, called to order by Pres. Wm Fizette at 1:35 p.m. EST. All those who attended the membership meeting were present.

The following were nominated as officers for the term Nov. 2001 to Nov. 2003: Pres. Wm Fizette; 1st VP Geoff Bourne; 2nd VP Ron Frisbie; Scty Joyce Peckham; Treasurer Randolph Haus. Motion to accept was made and carried.

The Treasurer's Report was given, with a balance sheet covering up to Oct. 31, 2001. Discussion ensued on income from conference and factors impacting it. Finance Committee will henceforth consist of Tom Peterson, head of the investment committee, and Stan Avery and Randy Haus. Motion to accept made and carried.

The President's Report to the Board was given and accepted.

Under Old Business the 2001 Annual Conference summary report was compiled by Bruce Roloson and presented by Hugh Davey, who will chair the Annual Conference for 2002. While book fair sales were lower due to decreased attendance, the programs were well attended. Included in these was the program of the Tube Collectors Association, presented collectively by George Fathauer, Jerry Vanicek, and Bob Duel due to the unfortunate absence of Lud Sibley.

Report on the ten Regional Meets held/scheduled for 2001 was given. The *OTB* and CD ROM project were reported on. Space in *The OTB* is becoming a concern due to the increase in contributions. The AWA Review Vol. 14, Tom Perera Editor, is now on sale, and Vol. 15 is in the works. Vol.1-5 are being digitized and put in CDROM format. The Board authorized the Museum to produce a CD of Reviews 6-12. This will be investigated. Tom is also working on an AWA telegraph anthology CD.

Regarding Chapters, a new AWA Chapter has been formed in Sarasota, FL. Reports were also presented on the AWA Internet Site, by the Investment Committee and by the Copyright Committee. We have been issued a copyright on the AWA Review Vol. 12, and action on the AWA

trademark application is expected shortly.

The Museum had a good year, with 702 visitors. Monetary donations are up, and one of the donations was the world's first transistor radio. More guides and a grant writer are needed. On advertising, Bob Schaumleffel reported that $1577 was spent for the past 12 months. Ads were placed in QST, Monitoring Times, the QCWA journal, and ARC. An advertising budget of $2500 was approved for 2002.

Under New Business, the new treasurer was instructed to prepare a budget for the fiscal year beginning 11/11/01, using the budget forecast prepared by the outgoing head of the finance committee, and under specified guidelines. Brother Pat Dowd was nominated and approved unanimously for honorary Lifetime Membership in the AWA in recognition of his many contributions. The question of the observance of the 50 years of AWA was discussed, with options presented. The Board authorized the *OTB* Editor to create a supplement to the *OTB* or a special *OTB* to be released during 2002. $6000 was voted and approved for this project. The Board authorized Tom Perera to edit and product Vol. 15 of the AWA Review during 2002. Discussion on the wording of four Procedural Documents which will eventually become part of the By-Laws was held.

The 2002 Annual Conference: Hugh Davey reported that after a detailed review of available sites, that the Conference would be best served if it is held in 2002 at the same location. The dates will be August 28-31. Lauren Peckham reported that the theme for 2002 will be the 50th anniversary of the AWA. A list of programs already listed was presented.

The AWA Inc. Board meeting was adjourned at 5:35 PM EST.

make available our normal complement of guest rooms. There are also other factors which can't be ignored, such as the staff's familiarity with our programs and needs.

With these things in mind, I am pleased to announce that the 2002 AWA Conference will be held at the Thruway Marriott, in its new guise as the RIT Conference Center, during the dates shown above.

Hugh Davey
AWA Conference Chairman

CALL FOR PAPERS FOR *AWA REVIEW* VOLUME 15

Papers are now being accepted for possible inclusion in Volume 15 of the *AWA Review* to be published in 2002. Papers on any topic related to the history of wireless and radio will be considered. In an attempt to link the Review articles to the annual conference topics, we are particularly interested in papers relating to the main topic of this year's conference, Stromberg-Carlson, and to the various programs and papers to be presented.

Please refer to previous issues of the *Review* for general formatting requirements and please send all submissions via email to the editor: Tom Perera (tomperera@ w1tp.com). Microsoft Word format is preferred. The deadline for submission of completed manuscripts is March 1, 2002.

Recurring Meetings & Events

• **Antique Radio Collectors of Ohio**—meets first Tuesday of each month at 2929 Hazelwood Ave., Dayton, OH (4 blocks east of Shroyer Rd. off Dorothy Lane) at 7 p.m. Also annual swap meet and show. Membership: $10.00 per year. For more info, contact Karl Koogle: mail to above address; phone (937) 294-8960; e-mail KARLKRAD@GEMAIR.COM

• **California Historical Radio Society**—For info on current meetings, call the CHRS hotline: (415) 821-9800.

• **CARS**, the Cincinnati Antique Radio Society—Meets on the third Wednesday of each month at ITT Technical Institute, 4750 Wesley Ave., Norwood (Cincinnati) Ohio. For more information contact Greg Tierney, (513) 732-1844, or Bob Sands, (513) 858-1755.

• **Carolinas Chapter of the AWA**—Hosts four "mini-swap-meets" each year (in January, May, July and October) plus an annual conference, "Spring Meet in the Carolinas," on the 4th weekend in March. Executive committee meets approximately quarterly. For more info, visit the web site at CC-AWA.ORG or contact Ron Lawrence, KC4YOY, Chapter President, P.O. Box 3015, Matthews, NC 28106-3015; phone (704) 289-1166; e-mail kc4yoy@trellis.net

• **Central Ohio Antique Radio Assn.**—Meets at 7:30 p.m., third Wednesday of each month at Devry Institute of Technology, 1350 Alum Creek Rd., Columbus. (1-70 Exit 103B). Contact: Barry Gould (614) 777-8534.

Antique Wireless Association, Inc.
Statement of Activities

NOVEMBER 2000 THROUGH OCTOBER 2001

Ordinary Income/Expense	Nov '00-Oct '01
Income	
6805C . CONFERENCE BOOK FAIR	2,902.85
6010C . CLUB MEMBERSHIP DUES	51,380.60
6020C . INT ON BANK ACCOUNTS—CLUB	231.94
6027C . DIVIDENDS—CLUB	2,727.92
6036C . CONTRIBUTIONS—CLUB	6,100.00
6800 . CONFERENCES	
6800C . CONFERENCE—GENERAL	33,347.90
6803C . CONFERENCE PREREGISTRATIONS	21,484.00
Total 6800 . CONFERENCES	54,831.90
Total Income	118,175.21
Cost of Goods Sold	
8110C . COST—AWA REVIEW 14 SOLD	13,339.71
Total COGS	13,339.71
Gross Profit	104,835.50
Expense	
8500C . DONATIONS -MUSEUM	110,484.26
8000C . OTB EXPENSES	
8040C . OTB PRINTING AND ASSEMBLING	22,369.75
8045C . OTB—ENVELOPES	79.78
8047C . OTB—STUFFING & MAILING	400.00
8050C . OTB—STAMPS	13,500.00
Total 8000C . OTB EXPENSES	36,349.53
8001C . BANK SVC CHARGE	680.22
8004C . HF CONTESTS	72.08
8014C . COMPUTER SUPPLIES	399.98
8030C . INSURANCE—OFF. & DIR. LIAB.	840.00
8041C . OTB CD-ROM PROJECT	3,227.33
8055C . POSTAGE MACHINE & MAILING	3,178.40
8065C . OFFICE SUPPLIES-CLUB	1,275.38
8067C . ACCOUNTING	2,636.00
8068C . LEGAL	4,412.96
8070C . BAD CHECKS -	27.00
8060C . GENERAL POSTAGE—CLUB	372.09
8091C . BOARD MEETING COSTS	932.26
8092C . BOARD MEETING TRAVEL	293.00
8115C . ADVER. AND PHOTOGRAPHY	2,717.24
8160C . TELEPHONE—CLUB	734.28
8191C . MISC. EXP.—CLUB	121.22
8192C . AOL SERVICE -SECRETARY	409.17
8200 . LOSS ON MARKETABLE SECURITIES	13,239.82
8300 . CONFERENCE EXPENSES	
8300C .CONFERENCE	100.00
8302C . CONFERENCE -AUCTION PAYOUTS	19,051.20
8303C . CONFERENCE SUPPLIES	52.88
8304C . CONFERENCE TRANS—BUS, SHUTT	5, 140.00
8305C . CONFERENCE AWARD MATERIALS	57.00
8306C . CONFERENCE FORMS -PRINTING	1,089.81
8307C . CONFERENCE BADGES	383.89
8308C . CONFERENCE SECURITY	1,167.00
8309C . CONFERENCE REG. REFUNDS	246.00
8310C . CONFERENCE CASH DRAWER SETUP	2,000.00
8311C . CONFERENCE HOTEL BILL	17,314.70
Total 8300. CONFERENCE EXPENSES	46,602.48
Total Expense	228,950.70
Net Ordinary Income	124,115.20
Other Income/Expense	
Other Income	
9500 . Unrealized Gain (loss) on Inves	14,285.76
Total Other Income	14,285.76
Net Other Income	14,285.76
Net Income	138,400.96

Antique Wireless Association, Inc.
Balance Sheet

AS OF OCTOBER 31, 2000

ASSETS	OCT 31, '00
Current Assets	
Checking/Savings	
1078 . HSBC CHECKING—CLUB	10,031.04
Total Checking/Savings	10,031.04
Accounts Receivable	
1300 . ACCOUNTS RECEIVABLE	
1335 . DUES	3,600.00
Total 1300 . ACCOUNTS RECEIVABLE	3,600.00
Total Accounts Receivable	3,600.00
Other Current Assets	
Certificates of Deposit	
1102C . CHASE 24 MONTH CD	26,570.63
1103 . CHASE—36 MO. CERTIFICATE—CLUB	21,409.33
1105 . CHASE—48 MO. CERT.—CLUB	15,611.57
Total Certificates of Deposit	63,591.53
1400 . PREPAID EXPENSES	
1415 . ROCH. HAMFEST	148.75
1490 . MISCELLANEOUS	385.00
1420 .ENVELOPES -OTB	300.00
1410 . ENVELOPES—GEN. CORRESPONDEN.	310.00
1405 . STAMPS	5,000.00
Total 1400 . PREPAID EXPENSES	6,143.75
Total Other Current Assets	69,735.28
Total Current Assets	83,366.32
Other Assets	
1200. MARKETABLE SECURITIES	
1233. MERRILL LYNCH MONEY MARKET ACCT	58,907.86
1232 .MERRILL LYNCH MONEY MARKET	84,716.12
1255 . FIDELITY ASSET MGMT MF	51,088.90
1231 . ALGER SMALL CAP FUND	6,813.35
1230 . ALGER MID CAP FUND	17,748.41
Total 1200 . MARKETABLE SECURITIES	219,274.64
Total Other Assets	219,274.64
TOTAL ASSETS	302,640.96
LIABILITIES & EQUITY	
Liabilities	
Current Liabilities	
Accounts Payable	
3032 . OTB	4,100.00
Total Accounts Payable	4,100.00
Other Current Liabilities	
3030C . DUES PD.IN ADVANCE	12,450.00
Total Other Current Liabilities	12,450.00
Total Current Liabilities	16,550.00
Total Liabilities	16,550.00
Equity	
3800 . RESERVES FOR AWARDS	5,990.10
3900 . NET ASSETS	418,501.82
Net Income	-138,400.96
Total Equity	286,090.96
TOTAL LIABILITIES & EQUITY	302,640.96

• **Delaware Valley Historic Radio Club**—Meeting and auction begins 7:30 p.m. on the second Tuesday of each month. Location: Telford Community Center on Hamlin Ave. in Telford, PA. Annual dues: $15.00, which includes a subscription to the club's monthly newsletter *The Oscillator*. For more info contact Bill Overbeck at (610) 789-8199 or Dave Snellman at (215) 345-4248. Club mailing address: P.O. Box 847, Havertown, PA 19053.

• **The Downer's Grove (IL) Park District Museum** sponsors a monthly "Collector's Hour." Participants have the opportunity to display collections at the facility for several weeks before making their individual presentations. The event is open to the public with no admission charge. The museum has also begun to sponsor a yearly "Collector's Fair." For more info, contact Mark Harmon, The Downer's Grove Park District Museum, 831 Maple Ave., Downer's Grove, IL, 630-963-1309, fax 630-963-0496, mharmon@xnet.com.

• **Houston Vintage Radio Association**—Meets second Tuesday each month (except Jan. and Dec.) at Lai Lai Restaurant, Tides II Motel, Houston Medical Center, Main and Holcombe Sts., Houston, TX. Meetings include auction/program, 7-10 p.m. Assoc. publishes *Grid Leak* quarterly, monthly activity announcements. Membership $15/yr. Write: HVRA, P.O. Box 31276, Houston, TX 77231-1276, or call Richard Collins, (713) 778-0721.

• **Hudson Valley Antique Radio & Phono Society**—Meets third Thursday of month, 7 p.m. Meeting, swap meet, and membership info: Peter DeAngelo, President, HARPS, 25 Co. Rt. 51, Campbell Hall, NY 10916. (914) 496-5130.

AWA LIFE MEMBERSHIPS ARE NOW AVAILABLE

Cost: $400 (U.S.)/$500 (Elsewhere)

Send your check to AWA Secretary Joyce Peckham, Box E, Breesport, NY 14816. Phone (607) 739-5443. e-mail: awapeckham@aol.com.

• **London Vintage Radio Club**—This Ontario, Canada club meets in London on the last Saturday of January, March, May, June and November. Annual flea market held in Guelph, Ontario in September in conjunction with the Toronto club. Contact: Lloyd Swackhammer, VE3I1A, RR#2, Alma, Ontario, Canada. (519) 638-2827.

• **Mid-Atlantic Radio Club**—Meets monthly, usually the third Sunday of the month at the New Hope Seventh Day Adventist Church, Burtonsville, MD. Contacts: President, Ed Lyon, 11301 Woodland Way, Myersville, MD 21773-9133, (301) 293-1773, e-mail lyon@fred.net or Membership Chair, Paul Farmer, (703) 960-0650, e-mail: oldradiotime@hotmail.com. Website www.maarc.org

• **New Jersey Antique Radio Club**—Meets second Friday each month, 7:30 p.m. Holds three annual swap meets. Contact (send SASE) Phil Vourtsis, 13 Cornell PI., Manalapan, NJ 07726, (732) 446-2427.

• **Northwest Vintage Radio Society**—Meets second Saturday of each month (except July and August), at or about 10 a.m., at Abemathy Grange Hall, 15745 S. Harley Ave., Oregon City, OR. Members display radios, exchange in-

AWA 50TH ANNIVERSARY COMMEMORATION

Your Help is Needed!!

The year 2002 is the 50th anniversary of the founding of the AWA, and we plan to issue a special supplement to *The OTB* commemorating our half-century history. It will be included with the upcoming May or August issue. Our Editor has been authorized to create the supplement (see board of directors meeting summary elsewhere in this section), and selected material will also be posted on our web page.

The quality and historical depth of this publication will depend, in large part, on contributions from you readers. We can't do this alone and we need your input. If you are able to share stories, reminiscences, pictures, etc, about AWA's activities over the years, please send them to me just as soon as possible. Don't be reluctant to include specialized subject material; there is a remarkable diversity of interests among our membership. All pictures and other material will be returned if a note requesting return is included. Please address your contributions to: William Fizette, Project Coordinator, R.R. 1, Box 55, Henryville, PA 18332. Questions? Contact me at w2dgb@enter.net or (570) 629-0637.

With the Chapters

The CC-AWA's Fall swap meet took place this past October. As in past years it was well attended. There were 40-50 vendors and I would guess 150+ shoppers.

We tried something new this year, an end-of-meet auction. As you would expect a lot of the items were pretty junky but there were a few goodies, I managed to get a fairly nice Radiola 28 for only $15. Now all I need to do is find a loop for it and a place to put it.

On December 22 we had our second Christmas Dinner, the first one was held several years ago. This year we met at the Sagebrush Steakhouse in Monroe, NC. We had a great dinner followed by an open house at Robert Lozier's home were folks not only got to see Bob's huge collection, including a working scanning disk TV, but also his newly completed "Dream Workshop." As BK used to say, "A good time was had by all."

By the time you read this, our Winter Swap meet will have just happened. This will be our third year in Columbia, SC. Last year the weather was great, the year before it was awful. I'll let you know about this year in the next report.

The CC-AWA's Annual Conference, the "Spring Meet in the Carolinas" is just around the corner, coming up on March 21-22-23 2002. It may be our biggest meet yet. We have several special events scheduled.

There will be a special auction of military radios and other military electronic equipment (200+ pieces) dating from the 1930s-1960s. This is part of a private collection that will be auctioned just before our regular Old Equipment Auction on Friday afternoon. Also look for a special display of artifacts from the early days of pioneer broadcaster WBT, helping to mark their 80th year in broadcasting. Among of the items on display will be photos from the 1920s, a tube from their 1922 transmitter, a 100,000 watt watercooled tube, and a 4-foot-square model of the 1927 transmitter site built by Ted Miller.

We will again this year be hosting "Radio Rescue." And in our continued effort to get more locals involved we will once again offer special "Saturday only" $5.00 admission. The special admission will only be available at the door on Saturday morning. To help promote "Radio Rescue" radio station WBT will be running promos in the weeks before the event and will broadcast it live from their mobile studio.

For full details on all of our events, including "Spring Meet in the Carolinas," just visit our web page at CC-AWA.org. There you will find a detailed schedule, a full contest listing, a printable pre-registration form, and a link to a separate web page with photos and a detailed list of the Military equipment to be auctioned.

All CC-AWA members, all AWA members living in North & South Carolina, and anyone that has attended the "Spring Meet in the Carolinas" in the last four years will receive a conference brochure in the mail. You can ask me for one by snail mail (P.O. Box 3015, Matthews, NC 28106-3015), e-mail (kc4yoy@trellis.net), or phone (704-289-1166 [home] 704-971-4932 [office]. However, all the information in the brochure is also on our Web page.

Ron Lawrence KC4YOY
CC-AWA President & Conference Chairman

formation. Guests welcome at all meetings and functions, except board meetings. For info, write the Society at P.O. Box 82379, Portland, Oregon 97282-0379.

• **Oklahoma Vintage Radio Collectors**—Meets second Saturday each month, Hometown Buffet, 1012 S.W. 74th St., Oklahoma City, OK. Visitors welcome. Dinner/socializing, 6 p.m.; meeting at 7 p.m. Membership, $12/yr., includes monthly *Broadcast News*. Info: SASE to OKVRC, P.O. Box 50625, Midwest City, OK 73140-5625; or call (405) 755-4139 or (405) 732-6070; or e-mail fkarner@mmcable.com.

• **Ottawa Vintage Radio Club**—Meets monthly (except June and July) in Conference Room, *Ottawa Citizen*, 1101 Baxter Rd., Ottawa, Ontario. Contact: Tom Devey, 601-810 Edgeworth Ave., Ottawa, ON K2B 5L5, (613) 828-5152. Membership: $10 Canadian/yr.

• **Pittsburgh Antique Radio Society** welcomes visitors to our Saturday flea market/contests in March, June, September, and December. An auction is included in September, and our annual luncheon/program is held the first Saturday in December. Our newsletter, *The Pittsburgh Oscillator*, is published quarterly. website: www.nb.net/~schaefer/pars.html For directions, specific dates, information call President Bonnie Novak at 412-481-1563 or write to Karl Laurin, 8111 Sally, White Oak, PA 15131.

• **Society for Preservation of Antique Radio Knowledge**—Meets at 7:30 p.m. the second and

fourth Tuesdays of each month in the party room at Cassano's Pizza Parlor, 1700 East Stroop Rd., Kettering, OH. Membership, $18/year. Write SPARK Inc, P.O. Box 292111, Kettering, OH 45429; e-mail sparkinc@juno.com or call John Pansing at (937) 299-9570.

• **Texas Antique Radio Club**—Meets alternate months in Kyle and Shertz, TZ. Contact: Ron Manning, President TARC, 133 East Huisache Ave., San antonio, TX 78212. Phone (210) 734-6831; e-mail ronmeg@gateway.net; website www.gvtc.com/~edengel/TARC.htm

Service Sources Available

The AWA Source Sheet is a listing of parts suppliers and services for the radio collector. Cost: only a business-size self-addressed stamped envelope to AWA, Box E, Breesport, NY 14816.

AWA Slide/Video Program

The Antique Wireless Association has available several historical documentaries to loan to affiliated organizations for club meetings and programs. There is no charge for this service other than return mailing cost. For info on loan conditions, to make reservations, or just inquire, contact Richard Ransley, P.O. Box 41, Sodus, NY 14551. The following are available:

VHS VIDEO PROGRAMS

V-2 — "Electrons on Parade." 18 min. 1938 movie made at RCA's Harrison Plant showing production lines with closeups showing receiving tubes, including a short sequence on transmitting tubes. (Very rare movie.)

V-4 — "The British Receiver." Documentary of the AWA/BVPS meet with visit to Marconi's Chelmsford plant, the British Science Museum, and ending with series of collectible British receivers. (VHS program transferred from slides.)

V-5 — "The Early Years." Historical documentary narrated by Clarence Tuska telling of the early years of amateur radio, founding of the ARRL and WW I military radio training school. (VHS program transferred from slides.)

V-6 — "The Key." History of the telegraph/radio key covering early hand keys, semi-automatics and commercial types. Script by Lou Moreau, W3WRE. (VHS program transferred from slides.)

V-9 — "The Transatlantic Tests and 1BCG." Rare documentary/photographs showing early amateur operation leading to famous 1921 transatlantic tests.

AWA NETS

PHONE:

SUNDAY:

7244 kHz, SSB, noon (NCS:WA4IAM);
3837 kHz, AM 4 p.m. (E.S.T.), 4:30 p.m. (during E.D.S.T.) (NCSs:W2ZM & W2AN)

TUESDAY:
14274 kHz, SSB, 2:30 p.m. (NCSs KC3YE and W0FXY)
3837 kHz SSB, 8 p.m. (NCS WB2SYQ)

MONDAY-WEDNESDAY-FRIDAY:
3867 kHz, SSB, 9:30 a.m. (NCS: W2OBJ)

CW:

DAILY, 4 p.m., 3588 or 7050 kHz.
Protocol, informal. Check both frequencies for activity and join in, or call AWA de (your call) and see what you stir up.

First **WEDNESDAY** of each month, 8 p.m., 7050 kHz

2-M REPEATER (Rochester Area)

MONDAY, 7:30 p.m. (NCS: K2GBR)
Receive 145.290 MHz
Transmit 144.690 MHz

V-12 — "Those Wonderful Magazine Covers." The story of radio through magazine covers. Colorful with period music.

V-15 — "The WHAM Story." Details development of a pioneer radio station in Rochester, NY. Program developed with assistance and recollections of Art Kelly, the station's former general manager.

V-16 — "The Charles Herrold Story." Video prepared by Mike Adams who donated this copy to the AWA. It documents the work of broadcasting's Forgotten Father who started broadcasting in 1912.

SLIDE PROGRAMS

S-1 — "Portrait of a Pioneer." The life of Elmo Pickerill.

S-2 — "Polar Adventure." Pictures taken by Bud Waite and his narration describing numerous trips to the Antarctic over a 35-year period.

S-3 — "70 Years of Vacuum Tubes." Describes the history of vacuum tubes.

S-4 — "The Early Years." (See description for V-5.)

S-7 — "The Transatlantic Tests and 1BCG." (See description for V-9.)

S-8 — "Trip Through the AWA Museum" Covers exhibits and equipment.

S-12 — "The Key." (See description for V-6.)

MUSEUM NEWS

Visit us on the Internet at http://www.antiquewireless.org.

OFFICERS
Director.....Thomas Peterson, Jr.
Deputy Director...Allan Pellnat
Secretary.....Edward Gable, K2MP
Treasurer.....Stanley J. Avery WM3D

BOARD OF TRUSTEES
Stanley J. Avery WM3D
Dr. Thomas Ely
Ronald Frisbie*
Edward Gable, K2MP*
Professor William Hopkins
Lauren Peckham*
Allan Pellnat*
Robert Perry
Thomas Peterson, Jr.*
Ronald Roach
Ronald Walker
Morgan Wesson
**Also on AWA, Inc. Board of Directors*

MUSEUM CONTACT
For all inquiries about the museum and its operation, contact Edward M. Gable, Curator, 187 Lighthouse Rd., Hilton, NY 14468 (716) 392-3088, e-mail k2mp@eznet.net

The AWA Electronic Communications Museum is an IRS 501(c)3 charitible organization.

From the Curator

Happy New Year. I hope and trust you all had a nice holiday season. We have a lot to communicate, so let's get right to it. In my last message to you, I described, in detail, the need to change the management scheme of your museum to meet the New York State Not For Profit and Museum Chartering regulations. Now I'm delighted to say that this has been accomplished.

At the November, 2001, AWA Board Meeting and Meeting of Museum Trustees, the newly formed management and Museum Bylaws were approved and set in place. The newly created team of Officers and Trustees is shown on this page. Notice that Tom Peterson, who so ably guided us through these difficult processes, remains as director. Also notice that several of our trustees also sit on the AWA, Inc. Board of Directors to maintain the continuing synergism between both organizations.

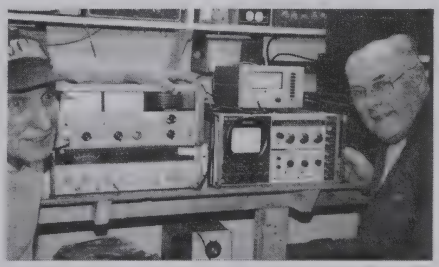
With all this accomplished, the final chartering application was sent to NY State just before the holidays. It should be a routine matter and we expect to hear from them soon. This activity has taken a ton of my personal time and your museum staff has also been very busy. The museum closed the season with a larger than last year visitation and improvements on all fronts. Donations, both in equipment and cash, also exceeded any other year in terms of quantity, uniqueness and value. I especially want to thank those of you, many donating anonymously, for your year end cash donations. Writing checks to "The AWA Museum" can be a good way to help your end of year tax problems!

Details on donations appear separately in this issue, but highlighted artifacts include the world's first transistor radio (no, not a Regency TR-1, far better than that), the first cellular telephone, two very rare Morse Registers, and a nice selection of modern Hewlett-Packard test equipment for the Museum restoration shop (the latter. a grant from Rockwell Collins in Cedar Rapids, Iowa).

New displays for your museum are in progress. This year is the 50th Anniversary of The Antique Wireless Association, and the story of its formation and transformation into a world-class organization will be shown. There will also be a display, compete with operational instruments, showing the evolution of Morse code technology from the days of sounders to CW. The first transistor radio will get a featured and permanent display.

Duncan Brown is preparing a display of radiotelephone over the years featuring the first cellular telephone (hint: Bell Labs) featured. The popular and functional RTTY station will be maintained, and the 1925 Radio Store and third floor ham area freshened up a bit.

There are two new staff members on your mu-



Facilities Manager Mani Peres (left) and Communications Equipment Manager Ron Walker are obviously pleased with the Hewlett-Packard and Boonton test equipment given by the Rockwell-Collins company.

seum workers list. One is Bob Roberts, WA2QAU. Bob is a Clegg collector and is good at multi-tasking. The other is Larry Brassie, WA2GHQ. Larry has been working on the inventory system with Art DeBruycker, W2YGW. I'm also delighted to report that Treasurer/Trustee Stan Avery is doing very well after recent surgery.

Among the recent donations was a set of office furniture that allowed us to create dedicated areas for the Registrar, the inventory/cataloging crew and a combined Treasurer's office and publications mailing area.

We have just recently completed a thorough study of the museum's audio/HiFi artifacts. We have way too much! For those interested in older tube audio, there will bew a nice selection of Scott, Fisher, Dynakit and more at the Spring Meet Annex Sale. I'm also working on an estate sale of very high end tube audio equipment in large quantities. If all works, that will also be at the Spring Meet. The meet will be on the first Satruday morning in May (the 4th) as always. See the "AWA News" column for details.

Just as with many other radio and ham meets, our trend will be towards quick, no frills events with emphasis on socializing and flea marketing. After two years of lost revenue, the luncheon and after-lunch auction will be absent. We *will* emphasize dawn 'til noon flea market, annex sales, and indoor coffee and snacks for those wanting to have informal or group meetings. Attendance remains free and the flea market is open to the public. Seller's fee is three dollars.

(continued on page 68)

SUMMARY OF MINUTES
AWA ELECTRONIC
COMMUNICATION MUSEUM
Membership Meeting, November 11, 2001

The meeting of the Members of the AWA Electronic Communication Museum (AWAECM) was called to order by Acting Director Thomas Peterson, Jr. Tom appointed Edward Gable as Acting Secretary for this meeting and instructed that the meeting notice, proxy form, and proof of mailing accompany the minutes.

Ronald Frisbie, acting as Chairman of the Proxy Committee, reported that 766 valid proxies had been received as of 10 FEBRUARY 2002. Joyce Peckham, A.W.A. Inc. Membership Chair, reported the 11/10/01 membership at 3,676. Director Tom Peterson declared a valid Quorum to exist and instructed the secretary to maintain the 11/10/01 membership list at the location listed in *The OTB* as "official museum business" and to make the list available for inspection.

Director Peterson asked Ronald Frisbie, acting as Chairman of the Proxy Committee, to report on Proxy item #1, the motion to set the number of Museum Trustees to 12. Mr. Frisbie reported 753 votes FOR, 4 AGAINST and 9 ABSTAIN plus five votes FOR from members present, for a total of 758/4/9. Allan Pellnat moved to accept, Lauren Peckham seconded. Passed.

Director Peterson asked Ronald Frisbie to report on Proxy Item #3, the election of names identified on the proxy and specified by expiration terms. Ron Frisbie reported 755 votes FOR, 2 AGAINST and 9 ABSTAIN, plus 5 votes FOR from members present, for a total of 760/2/9. Chris Fandt moved to accept, Larry Babcock seconded. Passed. Director Peterson referred members to detailed reports to be given in the trustees meeting to follow and financial and activity reports published in past and future issues of *The OTB*.

Tom Peterson asked for any other business. Attending member Chuck Bliley inquired about the Officer elections. Tom explained how, according to past and present by-laws, members elect Trustees and Trustees elect Officers. There being no other business Chris Fandt moved to adjourn, seconded by Allen Pellnat. Approved.

Respectfully Submitted by:
Edward M. Gable, *Acting Secretary*

AWA ELECTRONIC
COMMUNICATION MUSEUM
BOARD OF TRUSTEES MEETING
November 11, 2001

The meeting of the AWA Electronic Communication Museum (AWAECM) Board of Trustees was called to order by Acting Director Thomas Peterson, Jr. Tom appointed Edward Gable as acting Secretary for this meeting. He asked for a motion to approve the proposed By-laws, as previously supplied to all Trustees on October 20, 2001. Motion to approve by Robert Perry, seconded by Ronald Roach. Lauren Peckham questioned the use of the term "Vice-Director" in Section 5, Page 5. It was determined that this was in error and should read "Deputy Director" to coincide with all other uses and definitions. The Director called the question and the By-laws were unanimously approved as amended.

Ronald Frisbie, as Chairman of the Nominating Committee, offered the slate of officers

for a one year term covering 2001/2002, as: Director, Thomas Peterson, Jr. Deputy Director, Allen Pellnat; Treasurer, Stanley Avery; Secretary, Edward Gable. Ronald Roach moved to approve, seconded by Ronald Walker. Director Peterson asked to confirm the appointment of Edward Gable as Museum Curator, for an unspecified period of time and acting at the pleasure of the Board of Trustees. Moved by Lauren Peckham, seconded by Robert Perry. Unanimously approved. Director Peterson asked for a motion to set the Museum Accessioning Committee as: Curator Edward Gable, Deputy-Director Allen Pellnat, Registrar Jack Wenrich, and Assistant Curator Lauren Peckham, and as shown on the AWA Museum Organization chart, Revision C, dated November 10, 2001. Moved by Ron Walker, seconded by Robert Perry. Approved.

Director Peterson requested confirmation of the 2001/2002 Nominating Committee as Ronald Frisbie Chairman with Ed Gable and Ron Walker. Moved by Ron Roach, seconded by Stan Avery. Approved. Director Peterson asked for a motion that the A.W.A. Electronic Communication Museum purchase Trustee and Officer Liability insurance to the extent permitted by law. Moved by Ron Frisbie, seconded by Ron Walker. Called, approved unanimously.

Director Peterson asked for a motion that the "Museum Policy Manual, Revision B, dated 9/20/01, as amended from time to time, be the operational procedure document for the A.W.A. Electronic Communication Museum. Moved by Allen Pellnat, seconded by Robert Perry. During discussion a question arose regarding how the Manual was amended. Curator Gable pointed out that the manual contained its own Amendment provisions, further identified as the manual's "Amendment" section, paragraphs 1 and 2. Those provision were read to the Trustees present and no further issues were voiced. Called, unanimously approved.

Treasurer Avery presented the Finance Reports as prepared by the Heveron and Heveron accounting firm. It was pointed out that the report and the charts of account were works in progress and that this report presents the best and most complete data and correctly represents the just completed finance changes created by the reorganization of the AWAECM and AWA, Inc.

Tom Peterson reminded the Trustees that the funds transferred into the AWAECM by the AWA, Inc., were endowments used to support the day-by-day operation of the museum and could not be used for brick and mortar improvements. Morgan Wesson pointed out that the report's value of the current Annex building and land is less than a recent offer to buy and further, that the report does not report the value of the collection. Curator Gable reported that the value of the collection is reported separately on the "Value Report" and that a synopsis of that is provided in his Curator's Report. Director Peterson also pointed out that attorney fees were covered by member donations and little or no cost was accrued by the AWAECM. Move to approve by Robert Perry, seconded by Ronald Roach. Unanimously approved.

Curator Gable presented his operating budget for the coming year as well as this year's budget and actual costs. He reported that the budget was one of maintenance with not too much shown for growth. Some of this was due to slower than anticipated "AWA Review" book sales and uncertain Museum Cost of Goods of future reviews.

Lauren Peckham reported that he could not resolve the $3700 shown under Actual 2001 Museum Income, Line: "Percent of Conference General Auction." It was learned through discussion that the percentage of sales had been figured wrong and that the correct figure is $1800. It was further pointed out that the Curator's "Artifact Purchase Fund" was too low at $400.00 and that generally we should maintain a position to allow acquisitions when opportunities arose, although no specific action is required at this time. Moved by Robert Perry and seconded by Ronald Roach to approve as corrected. Called, unanimously approved.

Director Peterson addressed the Board with his vision of next priorities. His comments included improvements to the museum cataloging, space concerns and lack of room to handle collections of significant size. Preservation of current artifacts is a concern although the new "Adopt a Radio" Program was considered a plus. Regarding new acquisitions, the Director encouraged the development of an acquisition plan or "wish list" to fill voids in the collection. Finally, Tom urged to always remember the education and outreach requirements of our Charter and how our actions meet those needs.

Discussion following the Director's comments included how we may improve the content and preservation of our web site. It was pointed out that our Web Master, Chuck Schwark, is capable and eager to do more. Having asked for other business and there being none, Stan Avery moved to adjourn, seconded by Allen Pellnat. Approved.

Respectfully submitted by:

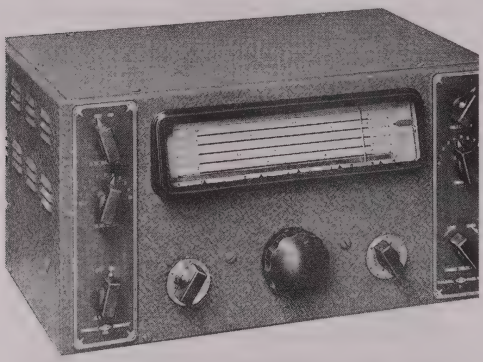
Edward M. Gable, *Acting Secretary*

THE COMMUNICATIONS RECEIVER

EDITED BY **WILLIAM FIZETTE, W2DGB**, RR 1, BOX 55, HENRYVILLE, PA 18332
PLEASE INCLUDE SASE FOR REPLY.

Those National AC-DC Receivers

As with many manufacturers of radio equipment, the National Company of Malden, Mass. tended to develop a design idea into a family of products; quite often the physical similarity of one product to another can be somewhat confusing. Thus it is with their plug-in coils for the Thrill Boxes and the SW-3, the coils for the FB-7 and FBX series and the AGS models, and the various versions of external power packs such as the "doghouses." Summaries of these have been presented in earlier *OTB*s.



The NC-81X AC-DC economy sliding-coil receiver. The -80X was similar in appearance. (From a National Company Advertisement)

The RCA Radiomarine Corp. AR 8505 receiver. (Author's Collection)

Another group of National "look-alikes" are the AC-DC receivers with slide-rule dials that were manufactured from 1937 through 1945. These began with the NC-80/81 and ended with the NC-45. Each was housed in a black-crackle steel cabinet the size of an National HRO receiver and had its distinctive slide-rule dial set at an angle. At first sight, one of these sets appears to be pretty much the same as the next, but there are differences in the circuits and internal physical designs as well as the front panel controls. All covered the BC band and the usual short-wave frequencies up to 30 mc, although there were gaps in coverage that varied due to the differing IF frequencies.

Jim Millen's design group introduced the idea of a communications receiver without a power transformer in 1937 with the announcement of Model 80X (general coverage) and 81X (ham bands) receivers. In those depression days, the relatively low price of less than $100 (including the separate speaker) was definitely a selling point. Though the receiver was designed as a compromise to achieve the low price, Millen seems to have insisted that basic engineering principles and the quality of components and construction would not be compromised. Left out were the power transformer, preselector, precision PW dial, and gadgets such as the S meter. But included were a sliding coil bank (a take-off from the NC-100 series) and a newly designed high-frequency crystal filter for the 1560 kc IF channel.

The next entry in the look-alike series was the 1938 NC-44. This model had bandspread, so a second tuning knob and indicator appeared. To further drop the cost, the sliding coil tray was rejected in favor of a simple wafer switch and coil bank. This certainly simplified construction. The omission of the heavy aluminum coil tray casting was also a big saving in scarce raw materials during our

extensive rearmament just prior to WWII. The IF was dropped down to 456 kc to enable coverage of the upper end of the BC band, but in so doing the image rejection suffered. The National catalog frankly admits that images were present because there was no preselector. But the price dropped down to below $50, at least in the beginning. The NC-44 was also manufactured as the AC-only model NC-44A, and the six-volt battery version NC-44B. Pictures of the NC-44 will be found in my "A Structured Approach" article elsewhere in this issue.

An interesting sidebar to the NC-44 design was the appearance of the RCA Radiomarine Corporation of America radio receiver Model AR8505, an almost-twin of the NC-44. There were a few minor design modifications, but the basic set was the same. It appears that RCA decided that this receiver would be an excellent addition to their shipboard installations, probably as a back-up or morale receiver. The lack of a shielded preselector and the tendency of these receivers to radiate an oscillator signal reportedly became a significant problem when the Battle of the Atlantic began in the early 1940s, but that is a whole other story that has been touched on in previous *OTB*s.

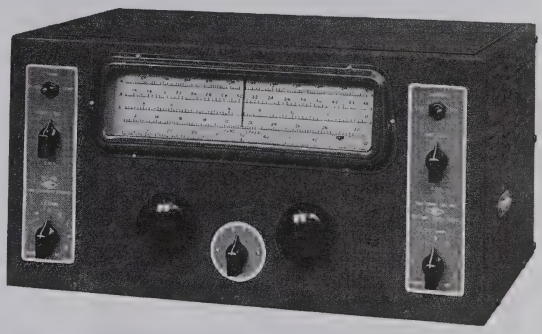
In 1941 the NC-45 (also the -45A and -45B models as above) was introduced. This was essentially an upgraded NC-44 with some circuit changes, but with an almost identical appearance.

Finally in 1945, at the end of WWII, National became "appearance" conscious, and brought out the NC-46. There were some more circuit changes, such as a PP audio to increase the audio output to three watts, but the internal layout remained essentially the same as the NC-44. What did change, however, was the external design, which definitely set this receiver apart from the previous look-alikes. Even the speaker cabinet was altered to reflect the post-war design thinking. The NC-46 has been discussed at greater length in the August, 1999 "The Comunications Receiver."

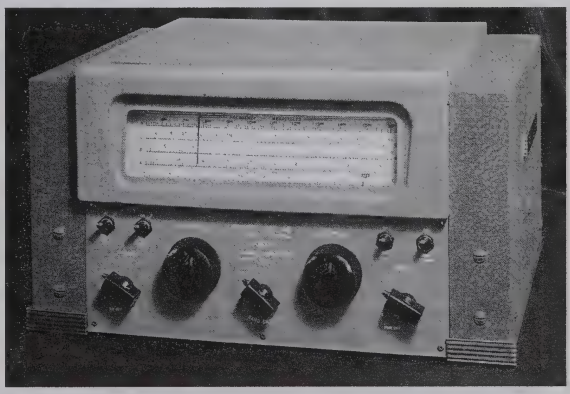
In the ensuing years there were a number of other AC-DC receivers in the National product line, including the NC-33, the NC-54, the NC-60, and the NC-66, but they were of distinctive appearance and will not be covered here.

If you are a National collector, you already know that the NC-80 and -81 receivers are relatively scarce and should be preserved. The -44s and -46s were more common in the flea markets in the 80s and 90s, but are now becoming scarce. The writer has never seen a NC-45. I'll be discussing more of these radios individually in due course.

If you do find one of these, don't just dismiss it as a piece of low-priced National junk.These receivers filled a real need in the 1930s and 40s as morale sets, marine receivers, and economy short-wave sets that were at least designed as communication receivers.



The National NC-45. This set was physically quite similar to the NC-44 (see "A Structured Approach...." article in this issue for pictures), except for the minor differences in the name plates. (National Co. Photo Courtesy Alan Douglas)



The appearance of the 1945 National NC-46 receiver reflected post-war design thinking. (National Co. Photo Courtesy Alan Douglas)

MICS AND MEN

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The Mic: 1917 Western Electric (Model D 14293)
The Woman: Janet Dell Freeman

After 28 years as a divorced man I found a woman I wanted to spend the rest of my days with. Janet Dell had been widowed for 8 years. We had been classmates in Radio Workshop at Heidelberg College in Tiffin, Ohio in 1954. Our best man was our professor in that class, Archie M. Thomas.

During our two-month engagement and our first 15 weeks of marriage, Jan accompanied me to no less than nine vintage radio meets. She even worked the registration desk at 2 Indiana Historical Radio Society(IHRS) events. And some of you saw her working registration at AWA's Rochester Conference last September.

Jan graciously models the D 14293 for our readers.

Last July 21st we entered our first old equipment contest together, at the Mid South Antique Radio Collectors (MSARC) in Louisville, KY. The category was "microphones." I provided the mic, a 1917 Western Electric D 14293. My documentation came from *The History & Evolution of The Microphone* by Bob Paquette (1999). It included a photo of a World War I biplane with a crew member, seated in the open rear cockpit, using the mic. Paquette's narrative (page 63) reads;

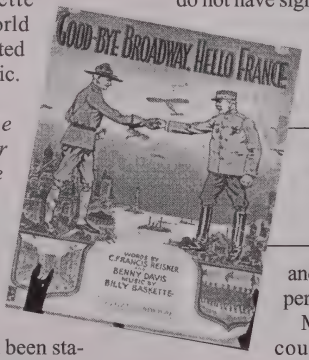
Western Electric equipped some World War I army aircraft with their model SCR68 radio transmitters. The microphone used with this transmitter was a specially designed noise canceling type. It was design specification #14293, later given model #T1.

Jan provided context for the display; a WWI doughboy hat, and a mess kit used by the soldier—who had been stationed at West Point, KY, just down the Ohio river from Louisville. These were both loaned by her son, Mike Dell. She also provided a photo of her father dressed in his WWI uniform and her mother's piano sheet music for "Goodbye Broadway, Hello France" a popular song of the period.

With the sheet music came a story told by her father. He had been in a formation marching through the streets of New York City during the wee hours to board the troop ships. The doughboys had been told to be as quiet as possible to avoid detection of this troop concentration by spies. But one of the soldiers couldn't help himself. He started singing that song and it was infectious. Soon almost everyone was singing it!

The competition in the category included a rare United Electric condenser mic with original table stand (both in excellent condition) as well as a W.E. 600-A with "Columbia" mic flag on a beautiful chrome desk stand. Voting was done by "people's choice;" there was no formal judging.

Considering this and other competition, we were surprised to learn that our first collaborative effort had won the blue ribbon! Many in our hobby do not have significant others who share interest in vintage radio. But it doesn't have to be that way. Often a second person brings a perspective and input that enhances the experience for both.



The song that "broke security" on the early morning march to the troopships.

My mic and documentation couldn't have won the blue ribbon without Jan's imaginative context. In fact, onlookers commented more about the "Smokey Bear" doughboy hat than on the microphone.

BELOW 535

EDITED BY **FRANK LOTITO, K3DZ**, 1428 O'BLOCK RD., PITTSBURGH, PA 15239
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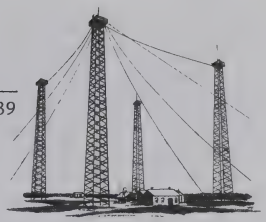

A Historical Review of Continuous Wave Radio Frequency Power Generators

Overview

The many disadvantages of the spark transmitters that were the original means of radio communication eventually led to the development of better methods for generating a radio frequency signal. Herculean-type arc transmitter ably presented in Henry Bradford's recent award winning article on the Marconi transatlantic site in Nova Scotia (1) was one historically significant means of developing large amounts of RF power in the long-wave spectrum. This article will briefly review some others. These were the Poulsen Arc transmitter, Alexanderson and Goldschmidt HF generators, and the static frequency changers.[1] Hopefully, one or more readers will be enticed to contribute detailed articles on each of these devices.

Introduction

At the start of the twentieth century, wireless communication lost its curiosity status and became a practical means of spanning large distances. "King Spark" ruled the realm. But all too frequently, the spark signals filled the airwaves with a muddle of almost unintelligible overlapping messages! The interference was due to a number of major factors:

1. There was little or no regulation of the airwaves or assignment of priorities. Radio services transmitted whenever they wished and in any part of the radio frequency spectrum they desired.

2. A transmitter "horse power competition" evolved. Those who could afford the more powerful transmitters built them in order to improve their chances of being heard.

3. The very wide bandwidth of the spark transmission[2] resulted in lower transmitter efficiency and communications effectiveness, while splattering the RF spectrum with interference.

4. The selectivity of the receiving devices was "wide as a barn door."

Competing proposals for correcting the situation came from government, academia and other scientifically-oriented establishments. Rules and regulations were promulgated on a national and international level. Needless to say, the *Titanic* disaster greatly accelerated certain types of legislative actions. On the technical front, competing methods to generate high RF power levels were under development and implementation. These new devices offered the promise of high power with minimum occupied bandwidth.

We must not forget other important early 20th Century factors that influenced the design of radio transmitters:

1. Receiver sensitivity was poor. Thus the need for high power transmitters.

2. Antenna efficiency at long waves was low; another reason to develop high-powered transmitters.

3. The radio community had little or no use for frequencies above 500 kHz. The role of solar activity and the ionosphere on radio communication had yet to be understood. VLF and the lower LF frequency range seemed to propagate 24 hours a day.

4. The three-element vacuum tube just started to make a feeble showing. We had to wait until World War I to see the development of vacuum tubes

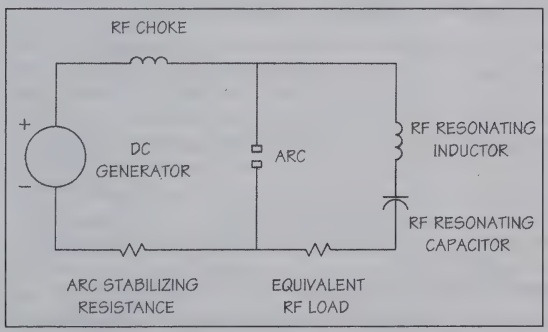

Figure 1. Basic Poulson arc system.

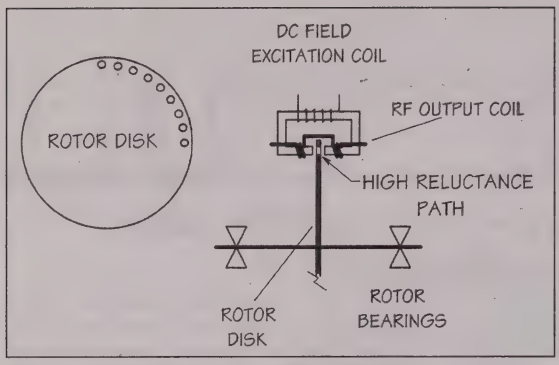

Figure 2. Basic Alexanderson HF alternator.

having power capability adequate to be used in the design of low to moderate power transmitting sets.

We will briefly explore the more significant devices that were developed for generating high-power radio frequencies to replace spark. These were generally developed by personnel and companies already actively engaged in the commercial and residential electrification of our country.

The Devices

1. The Poulsen Arc Converter. Basically, this generator can be likened to a continuous-duty-rated electric arc welder with a tuned circuit connected across the arc. Figure 1 gives a typical schematic of such a transmitter. The "negative resistance" characteristics of an electric arc converts direct current to radio frequency. The arc takes place between a carbon and a copper electrode encased in a closed hydrogen rich atmosphere. The electrodes are cooled by water. A magnetic field is presented at right angles to the arc. This field helps to stabilize the arc and improve overall conversion efficiency. In today's world we still find oscillators based on negative resistance devices; the tunnel diode is one of them.

2. The Alexanderson HF Alternator. The concept of this device is relatively simple. Vary the flux within the air gap of an electromagnet. This induces a voltage in the electromagnet's winding according to the relationship

$$E=d\phi/dt,$$

where E is the induced voltage, and $d\phi/dt$ is the rate of magnetic flux change with time.

In the Alexanderson alternator (Fig. 2), the electromagnet is a stationary laminated steel structure with two windings. One winding biases

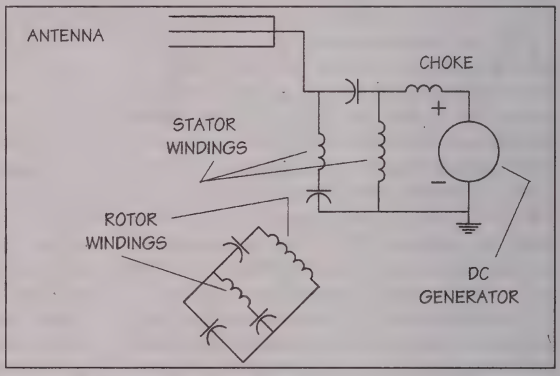

Figure 3. Basic Goldschmidt alternator.

Examples of the Frequency Multiplying Effect in 3-Stage Goldschmidt Alternators of Different Configurations[3]

Stator excitation Frequency	Stator frequencies Produced	Rotor frequencies Produced
N	N	2N and 0
	3N and N	4N and 2N
		5N and 3N
0 (i.e., DC)	0	N
	2N and 0	3N and N
4N and 2N		

where N is the frequency of the alternating field current

Table 1

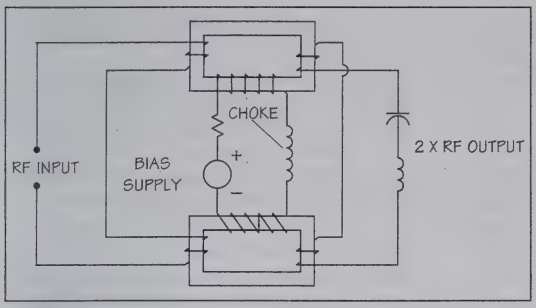

Figure 4. Times two frequency multiplier.

the electromagnet; the other is the "RF pickup" winding. The rotor is a laminated steel disk with "windows" cut into the disk near the disk's rim. The rotor has no windings. In the "windows" are materials having a high magnetic reluctance, such as brass.[3] The windows are filled primarily to reduce wind drag and quiet the siren effect. Typical rotor speeds are in the order of 10 to 20 thousand r.p.m. The alternator's armature was driven by a step-up gearbox to produced this high speed.

3. The Goldschmidt, or Reflection-Type (Frequency Changing) Alternator. The first concept to understand is two currents are produced in a coil rotated at synchronous speed within a volume swept by an alternating magnetic field (Fig. 3). In order not to get bogged down in motor theory, take the following on good faith: one current is zero, while the other current is in the opposite direction, and double the frequency, of that in the rotating field. If we feed this current back into the machine, we generate two more currents, one at synchronous speed, the second at three times the synchronous speed. Table 1 gives an example of the frequency multiplying effect that can be realized for two possible Goldschmidt Alternator configurations.

Notice the "tuned circuits" of the armature and stator windings. The tuned circuits enhance the development of the desired harmonic currents. The process of feeding back the armature current allowed for the development of RF currents at armature speeds in the order of 3600 RPM. Quite reasonable compared to the significantly higher Alexanderson Alternator's armature speed.

4. Static Frequency Changers, aka the Joly/Valouri and Taylor Systems. These passive devices operate on the principle that an appropriately designed laminated iron core can produce an asymmetrical flux variation within a saturated core. Since the saturated core reactor (inductor) is non-linear, the net result (without belaboring the theory) is that the circuit's drive current produces strong harmonic components. Obviously, an RF input is required. This can be provided by a Poulsen Arc Converter, or an Alexanderson or Goldschmidt Alternator. Figure 4 illustrates the Joly/Valouri type of passive frequency doubler. A discussion on the Taylor tripler can be found starting on page 743 of reference 3. It is interesting to note that in modern times, passive nonlinear devices continue to be used to multiply frequency at low to moderate RF power levels. For example, the VHF to UHF, and the UHF to microwave varactor diode frequency multipliers[4].

Characteristics of the RF Power Generators

The RF power generators described above were available in power ranges from a few kilowatts to a half-megawatt or more. Only the Poulsen Arc converter and passive frequency multiplier were suitable for portable and maritime use. The two alternator designs had to be precision machined to close tolerances in order to achieve decent efficiency and high power output. The gyroscopic and centrifugal effects caused by the high rotor speeds would tear these machines apart if used on shipboard.

CW was the typical modulation scheme used. It was not uncommon to send 100+ WPM CW from pre-made punched paper tapes. The received signal would be recorded, then played back at a lower speed for transcription.

Since the arc equipment took a little coaxing to get it started and operating in a stable fashion, normal "on-off" CW keying could not be used. Instead, a form of frequency shift keying was employed. The arc was left operating continuously and a portion of the tuned circuit was shorted out when the key closed. Therefore, the "mark" (key closed) was sent at one frequency; the "space" (key open) at another frequency.

If these frequencies were far enough apart, and the receiving station receiver had adequate selectivity, the receiving station would hear standard CW when tuned to the "mark" frequency. The tone was a little on the rough side. The arc generator's frequency multiplier and antenna tuning had to be selective enough to suppress the high harmonic output of the arc converter.

Modulation of the two alternator designs was done primarily by diverting the alternator's output power, or by detuning an impedance match-

ing circuit at the alternator's output. Amplitude modulation could be realized by varying the alternator's stator field current at the audio rate. Precise armature speed control was required to maintain a constant frequency output.

The arc converter and Goldschmidt Alternator were most successful when made to operate in the frequency range of a few kilohertz to a few tens of kilohertz. The passive frequency converter was relied upon to bring the output frequency up to "practical" transmission frequencies, i.e. 16 to 200 kHz.

Designing the Alexanderson Alternator for the lower frequencies was also helpful; it lowered the rotor speed and lightened the design and manufacturing tolerances. However, 200-kHz Alexanderson machines of moderate power were manufactured and used with some success. No doubt the electrical designers had to balance the losses in the RF generators and frequency converters against the higher radiation efficiency achievable from antenna systems designed for the shorter wavelengths.

Conclusion

By the start of the 1930s, the vacuum tube had taken over as the undisputed king of RF power generation for both long and short waves. A few US Navy and foreign government long-distance VLF and LF mechanical generators did survive to the end of World War II. The interested reader may wish to search the Internet using "Goldschmidt" or "Alexanderson" as key words. A historical preservation society in Sweden has probably the only surviving operational HF alternator. This 17.2 kHz machine comes alive for special occasions. It is infrequently heard in N. America. Use SAQ or Grimeton as your browser's search criteria for the Swedish Alexanderson Alternator web site. Scroll down and click on the English language link. The Long Wave Club of America web site, http://www.lwca.org, also features articles and Internet links on low frequency generators.

NOTES

1 The development of high-power vacuum tubes during and immediately following World War I will not be considered. Without a doubt, the vacuum tube instigated the rapid demise of all prior forms of RF power generation. Also not discussed in this article is the "multiple disc dischargers" spark transmitter, which created a more continuous wave emission from a rotary disc spark transmitter. See reference (2).

2 "Occupied bandwidth" is a modern term quantitatively describing the bandwidth of a transmitter's radiated signal at points 23 dB down from the mean signal power. For example, with a well-designed AM transmitter, the occupied bandwidth is approximately twice the maximum modulation frequency. In a modern transmitter design, the CW signal without an adequate key click filter can have an occupied bandwidth of tens of kHz under good propagation conditions. For a spark transmitter, the effective bandwidth is literally hundreds of kilohertz! See reference 5 for a more thorough discussion of occupied bandwidth.

3 Reluctance is the "resistance" to the passage of magnetic flux, usually designated as a script "R." Permeability, designated as a lower-case Greek mu, is the ratio of the number of lines of (magnetic) flux that exist in the material (a magnet's core) as compared to a vacuum (core). See Dawes, Chester, A., *A Course In Electrical Engineering*, McGraw-Hill Book Company, Inc., NY, 1937, volume 1, 3rd edition, page 250.

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(2) Bucher, Elmer, *Practical Wireless Telegraphy*, The Wireless Press, NY, May 1918, section 219, pages 274-276.

(3) Morecroft, J. H., *Principals Of Radio Communications*, John Wiley & Sons, Inc., NY, NY, 3rd Edition, 1933, Page 735.

(4) Amateur Radio Relay League, *The Radio Amateur's Handbook*, Newington, CT, 1981 edition, pages 4-11 through 4-13 (and other editions of that period).

(5) Amateur Radio Relay League, *The Radio Amateur's Handbook*, Newington, CT, 1992 edition, Chapter 9 (and other editions of that period).

SCHEMATIC SOURCES

Morecroft, J.H., *Principals Of Radio Communications*, John Wiley & Sons, Inc., NY, NY, 2nd Edition, Chapter VII, Figures 4, 20 and 24: Poulsen Arc, Goldschmidt Alternator, Joly/Valouri Frequency Doubler, respectively.

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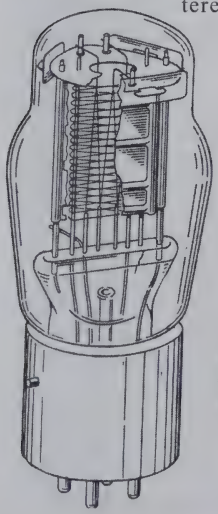
Western Electric and the "ST" Bulb

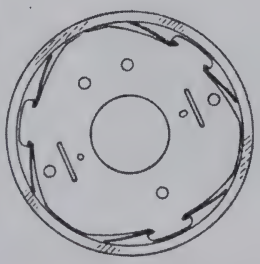
Most tube manufacturers converted their products from "S" shape bulbs (also known imprecisely as "globe" or "balloon") to the domed "ST" shape around 1932. The change occurred quietly, yielding mainly the feature of improved support of the elements by the use of a mica separator wedged into the dome at the top of the bulb.

Bell Laboratories, designer of the Western Electric line of tubes, adopted this innovation, and devised several others, which they applied to new tube designs through the 1930s.

By contrast, Western Electric's "tennis-ball" repeater triodes, with their then-archaic glass-arbor mounts, stayed in production until much later, more like 1939. At this point, the designers took the opportunity to make definite improvements, using design ideas that had proven successful for several years. An article in the *Bell Laboratories Record* for March, 1940 describes a group of five tennis-ball tubes that were redesigned, these being the 101D, 101F, 102D, 102F, and 104D. (The ST-bulbed 205F appeared in 1942.)

Addition of a mica spacer at the top of the mount gave tighter control over dimensions, and thus of electrical performance. The mica was centered by using bent-mica springs rather than the cheaper technique of stamping serrations into its edges. The filament-tensioning hooks in WE's new types were welded to studs inserted in the mica. An unusually robust "press" and stiff vertical leads provided support at the bottom, rather than use of a lower mica as was common among other makers.





Left: The Western Electric "ST" style repeater triode. Right: The new mica top spacer had integral "springs" to keep it firmly centered (see text).

The increased rigidity paid off in reduced microphonic pickup: the new 101F, for example, tested about 15 dB quieter than the older one. The top mica was sprayed with an insulating coating to roughen its surface, thus reducing the chance of leakage from metal particles (getter or filament material) evaporated onto it. The new types also got blackened plates across the line, for lower operating temperature. The wires in the press were spaced unusually far apart, reducing leakage between elements by about ten to one. This probably obsoleted the existing 101J and 102G "high-insulation" types.

The filaments were improved too. They were kept at the old level of current draw for interchangeability, but got a whiter surface and about three times the surface area. This was claimed to give considerably longer and more uniform life. The 101F was said to go from 18,000 hours average life (sensational by itself) to several times longer than that, the exact improvement not being known at the time.

The new line shared several parts: only two types of press, plate, and mica separator. The result was, not surprisingly, lower cost.

WE's "ST" types may lack the prestige of the tennis-ball versions, but they were certainly better tubes. Of course, everything that's old is new again: we now see Chinese-made "300B"s in "S" bulbs, and even "6SN7s" in tennis-ball format, pointed toward the cachet-driven tube-audio market!

BY BILL FIZETTE, W2DGB

A Structured Approach to Fixing up Those Nice Old Radios

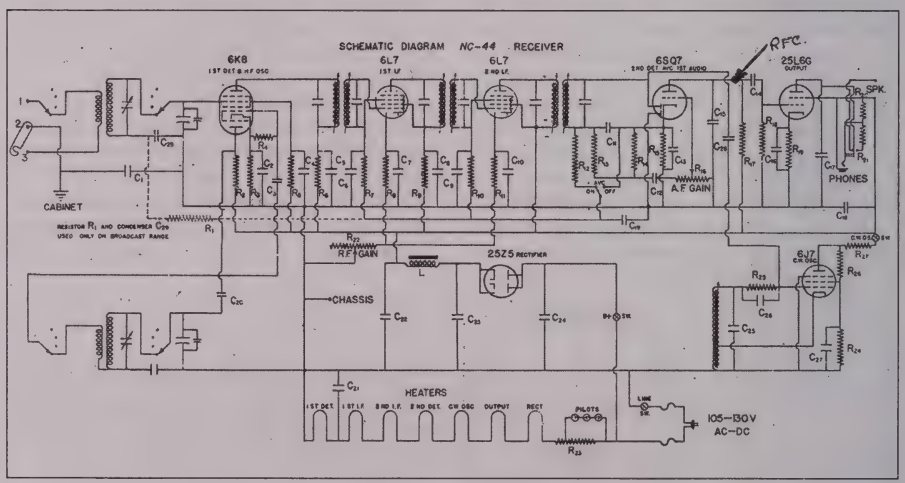
7 — Fixing up a National NC-44

While wandering through the flea market at the AWA Conference last fall, my eye fell upon a National AC-DC communications receiver from the depression era. It was a 1938 model NC-44. At first glance it didn't look too scruffy, so I took a closer look. The original black crackle paint was in good shape, and most important, there were no signs of gratuitous holes drilled in the front, top or sides. Inside, the set was relatively clean, and although there were some signs of abuse, it appeared to be a good candidate for restoration and discussion in this column.

Here's some background on this receiver. In July 1938, James Millen announced that The National Co, creator of such remarkable and world-famous receivers as the HRO and NC-100, would now offer a receiver that would sell for $49.50. It would be called the NC-44. The marketing department thus hoped to reach out to the many depression-era amateurs who simply could not afford the well known and much more expensive standard receivers in the National line. National also wished to be competitive with the low-priced offerings of companies such as Hallicrafters.

What evolved was an AC-DC set (no power transformer) with band-switching coils for four bands, including the standard broadcast band and the usual short-wave frequencies up to 30 mc. Plans to cut costs by using a stock BC receiver tuning capacitor had to be shelved because of quality problems, and a special National-built, two-gang, straight-line unit was finally settled on. But instead of the complicated and expensive sliding-coil arrangement used in the previous AC-DC sets, the coils were simply selected by a ganged wafer switch.

The seven-tube receiver had no RF stage or filter, but there were three i.f. stages. The model 44A, an AC-only version with an isolation trans-



Circuit diagram of the Model NC-44

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e-mail w2dgb@enter.net

former, was also available. Another variation was the NC-44B, powered from a six-volt battery. Consistent with 1930s design practice, the output transformer was mounted in the speaker cabinet, with all the resulting inconveniences and extra expense for the purchaser.

On the bench, inspection revealed that the fiber antenna post strip was broken, the dial cords for both the band-set and band-spread capacitors were missing, as was the band-spread dial slider. The original dial glass had been replaced with a piece of plastic. There were no dial lights or tip jacks for the speaker leads. The gum-rubber isolating grommets were deteriorated and useless, and there was the usual assortment of bad capacitors and resistors.

By the way, I have not mentioned that my objective here was to restore this set to operating condition. We have discussed this issue in past columns, and it is a question you should ask yourself with each radio you work on, before you begin.

Once the chassis was separated from the cabinet and the accumulated dirt washed away, I began to deal with the physical problems. Unfortunately the "manual" for the NC-44 was a masterpiece of brevity, with none of the information, for example, as how to restring the dial cords. This is often a tricky job on old receivers, and here there were two to replace. Fortunately, the post-war model NC-46 was similar in physical design, and the more detailed Sams manual did have that information. The missing band-spread slider was adapted from a similar slider taken from an old BC receiver. The scratched and incorrect plastic dial cover was replaced with a piece of glass.

The black crackle paint was brought back to life with a misting by black glossy Krylon enamel. If you can get a slower-drying enamel, another technique is to wipe it on the original with a piece of toweling. The knobs were buffed with a cloth wheel chucked in a drill held in a vise, using a good quality paste furniture wax. Missing hardware was replaced and the controls and gears were cleaned and lubricated. The missing antenna/ground screw connector strip on the side of the cabinet was replaced.

One very important design feature of any AC-DC receiver is the separation of the outside cabinet from the chassis, which has a 50% chance of being live with 115 VAC, a deadly situation. In this case, gum-rubber grommets were located at nine points around the chassis, with metal studs mating with screws through the outside cabinet. As long as the rubber was in good shape, there was complete electrical isolation of the two sheet metal structures. The only connection was through C1, the 0.1 mF 400-volt isolating capacitor.

I replaced the deteriorated original grommets with new black rubber items. When the cabinet was mated back with the chassis, they seemed to fit well, and an ohmmeter check showed electrical isolation.

This is a good time to mention the need to use an isolation transformer while you are working on a live chassis. Be safe...not sorry. In fact, I even considered permanently installing an isolation transformer in the space to the rear of the filter choke, but decided that was too drastic a design change (this was an NC-44, not a -44A), and instead settled for an external unit.

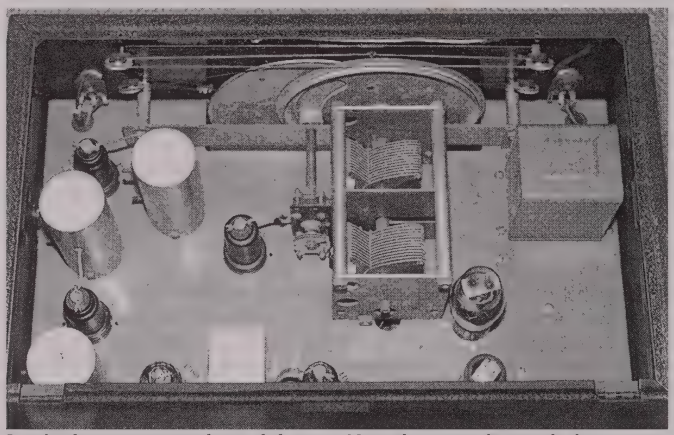
One other missing structure was the dial light assembly. "So what?" you say. If you will look at the diagram it is apparent that the three dial lights are an integral and necessary part of the filament string, standard with AC-DC circuits.

The restored NC-44 with matching speaker.

The "manual" says they are brown bead, 6.3 volts, drawing 0.15 ampere. So far, so good. But how to mount them?

I puzzled over this until another of the receivers of the same design was located and studied. It appeared that the lamps were assembled into a split white fiber tube. The space was very tight, and finally a ½" piece of tubing was found that would fit. A slice was cut out with a Dremel tool, the bulbs mounted and wired in, and the whole jammed in under the front lip of the cabinet.

If by now you are under the impression that the physical restoration is often more work than the electrical, you are correct. The circuit tracing and the replacement of the bad capacitors and resistors is pretty much standard, and as long as you do it one item at a time, make notes and sketches, and check against the circuit diagram as you go, you should have no trouble. In addition to the four electrolytics, I replaced 17 other tubular capacitors, several resistors, and installed a new line cord.



Inside the receiver with top lid open. Note the special straight-line tuning capacitor.

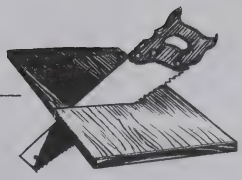
I was in the process of adapting an old speaker with an attached output transformer when fortune smiled! I actually located an original National speaker for the NC-44 receiver! This I must admit was nothing more than good luck, as speakers for older communications receivers were not too plentiful to begin with, and are now considered rarities. The point is that while it is nice to have the original, it is not absolutely necessary in most cases, especially if the speaker is the permanent magnet type as it is with the NC-44. Just remember that the speaker leads are carrying the full B+ voltage up to the primary of the output transformer mounted on the speaker frame, so be sure they are in good shape.

The moment of truth had arrived. The speaker was hooked up, the receiver plugged into an isolation transformer, and the transformer plugged into the bench Variac. The receiver cabinet top was screwed down to keep careless hands away from the chassis, and with the tubes in the correct sockets, the AC voltage was brought up slowly while the B+ line voltage was monitored. Hey, it worked! With a short wire on the antenna post, the circuit came alive and stations were heard. The i.f. trimmers were adjusted for maximum noise, and then the dreary and tedious job of i.f. and r.f. alignment was begun.

One point to remember: If a receiver is of solid design and has not been abused very little readjustment will be necessary. In this case the i.f.s were close to the specified 456 kc, but the RF circuits were badly out of alignment. Again the 1938 "manual" failed to give the needed procedure (trade secret?) so once more the post-war Sams manual for the NC-46 was consulted. Fortune smiled again and the information was found to apply equally well to the pre-war NC-44. Even so the process was tricky, and it was found necessary to repeat the steps several times to be sure that the work was done correctly.

This essentially completed the restoration. While it is hardly a modern receiver, careful tuning brings in CW, AM, and SSB stations. The foreign broadcast stations pour in on the 7-10 mc band, and occasionally WWV will appear out of the confusion. Performance is about what is expected with no RF stage, but overall, it is a well-built sturdy receiver that must have worked well for general and beginning amateur use. The restoration described above used the bench arrangement and tools and followed the guidelines of the previous columns. There is nothing mysterious about this work, as long as you proceed carefully and check yourself as you go along.

Those with questions can reach me at w2dgb@enter.net. No guarantees, but I will try to help.



Bring Historical Circuits to Life On Your Workbench!

Super-Regenerative Detectors, Part II

There's a lot more to be learned about these detectors. Quite a bit of mail came in after the last column, and we'll dig into the topic some more now.

Chuck Porter up in Troy, NY sent me a postcard reminding me about an old *Popular Electronics* article (1) giving a design for a one-tube FM receiver using a 6C4 superregen circuit. I happen to have a copy of that one, and here's the circuit (Figure 1). This is a variation of a circuit invented in the 1920s by Aubrey Flewelling (1866-1932). It's called a "self-quenching" super-regenerative, because the tube, with its grid positively biased through several megohms, just *has* to oscillate! The quench frequency depends on the RC time constant at the grid, which should be some supersonic value, and any signal at all from the antenna gets rectified all across the operating range of the tube, then filtered between the plate and the output to remove all the leftover RF.

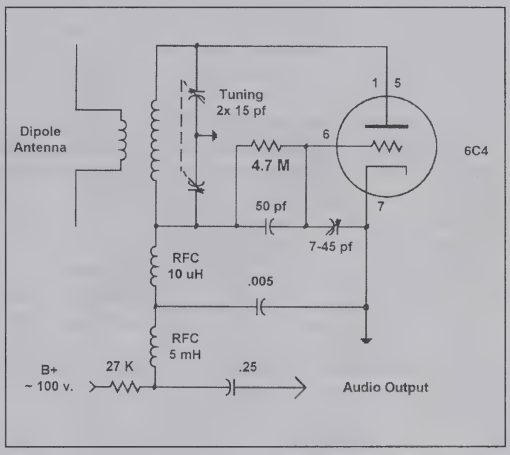


Fig. 1. One-tube FM super-regenerative circuit.

If you look in the back of an RCA tube manual (2), you'll find a circuit whose detector stage is a lot like this one. But how would it work on FM? I built up the circuit and fooled around with different tuning coils until I got one that worked across the FM band. Figure 2 shows what my breadboard looks like. Just as Chuck Porter claimed in his postcard, this circuit picked up several stations with no antenna other than the tank coil.

I wrapped a copperclad box around the works, thinking to add an RF stage later in order to reduce the radiated RF from the detector, and fed the tank through a 2 pF capacitor at the grid side. Worked OK, but I still had an awful lot of RF that appeared at the output. Recovered audio was about 20 millivolts, but there were

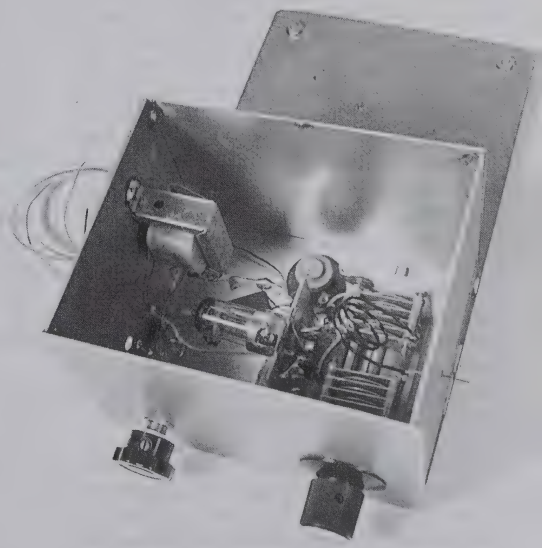


Fig. 2. My 6C4 breadboard receiver.

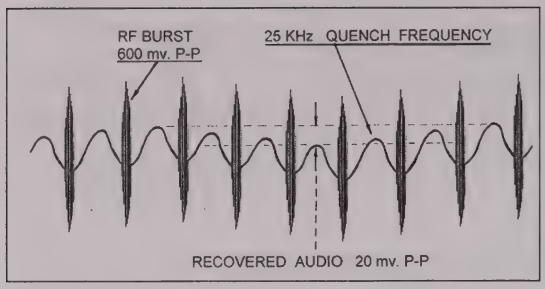


Fig. 3. Recovered audio waveform, circuit of Fig. 2.

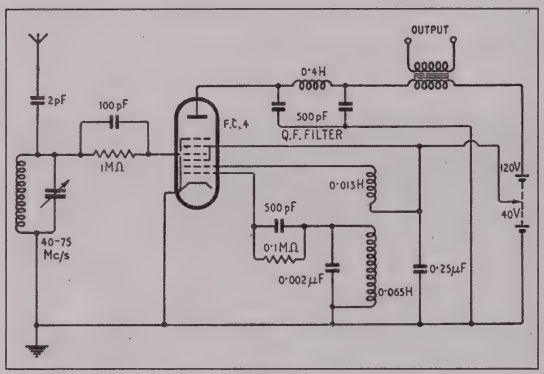


Fig. 4. "Cathode Ray's" recommended super-regenerative circuit.

600 mVRF bursts at a 25 kHz rate, as well. Expanded, my O-scope display looked like figure 3.

When I coupled the audio out through a common 3:1 audio transformer, the bursts dropped to maybe 150 mV peak-to-peak. One doesn't hear all that stuff, but it will get into any audio amplifier connected to this "receiver," and I bet the original PE article was exaggerating when it concluded: "… you're likely to be swamped with friends by the bushel who want you to whip up one for them." If you absolutely have to use this circuit, add a 4-pole lowpass active filter with a cutoff at about 10 kHz before further amplification!

Then came a letter from Jim Wood of Brea, CA, who enclosed a copy of a chapter on SR receivers from a book written in 1955 by M.G. Scroggie who, back then, styled himself "Cathode Ray" in the pages of *Wireless World* (3). Here's how Ray's chapter begins:

A good single-valve super-regen is as sensitive as almost any receiver can be, regardless of the number of valves. So far from falling off at the ultra-high frequencies, it works better. It includes automatic gain control that would need a multi-valve superhet to equal. On top of it all, it deals effectively with interference of the motor ignition type…

We don't have room to quote more of this chapter, which explains how super-regeneration works better even than Armstrong's patent application. Amazon.com had a couple of used copies of Scroggie's book, and I can certainly recommend it for further reading on many different radio topics. He writes with humor and irony, yet makes complex ideas very clear indeed. "Cathode Ray's" favorite super-regen circuit is shown as Figure 4. Looks something like a superhet converter stage, doesn't it? Here's how it works:

The first two grids, normally used for the local oscillator in a superhet, are employed to generate the quench frequency; and the RF goes in, also quite normally, at the control grid… it works at VHF because the effective cathode is somewhere between the visible cathode and the control grid, and stray capacitances cause the circuit to oscillate in the Colpitts manner.

Maybe, you don't have an F.C.4 converter tube lying around, I don't either, but I'm gonna try a 6BE6 and see if I can get this thing to work in a breadboard. Too bad Armstrong didn't have 6A7Gs to fool around with in 1922. Results next time!

Another great letter came from Van R. Field in Center Moriches, NY. He tells of production radios that used the SR system, reminding us that "Super-regens like lots of AM. Wideband FM is readable, narrow band is usually not." My SR breadboard proves that's true; its tuning is touchy and the sound quality is far from hi-fi!

REFERENCES

(1.) *Popular Electronics*, "One-Tube FM Tuner;" August 1960, pp 49-52

(2.) *RCA Receiving Tube Manual*, Series RC-19; Reprint by Antique Electronic Supply; p.355

(3.) *Second Thoughts on Radio Theory*, "Cathode Ray," Iliffe and Sons, Ltd; London, 1955, pp 45-46.

BY EDWARD P. SWYNAR, VE3CUI

A 1929 AMATEUR RADIO STATION FOR THE NEW MILLENNIUM

Part 2 — A Final Amplifier for the 1929 Hartley

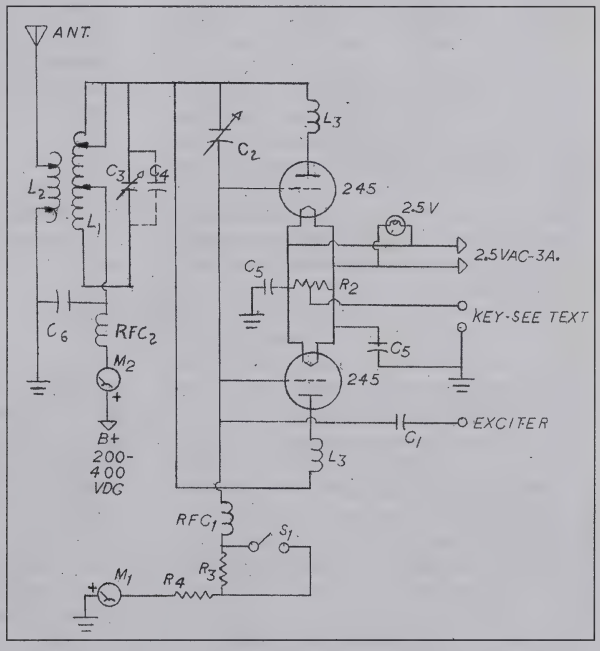
Introduction

Building and operating a single-tube self-excited oscillator/transmitter is certainly a fun, worthwhile exercise. However, the time eventually comes when a little extra "horsepower" is needed to help overcome band conditions, or—as in my case—to take advantage of the "higher power after midnight" rule in the Antique Wireless Association's Bruce Kelley Memorial 1929 QSO Party.

One option to double the power input of your existing Hartley might be simply to add another tube in parallel or push-pull. The latter method was, in fact, quite popular with hams well into the 1930s. But the disadvantages of this technique are just as valid now as they were then. Whether built with one tube or two, a self-excited circuit wastes a lot of the tube's potential.

A push-pull pair operates at about 33% efficiency, just as does a single tube. Adding the tube *does* double the power output, but it also doubles the power *wasted*. And an extra tube used this way does absolutely nothing to prevent the minutest of changes in load from affecting the stability of your transmitted signal. A breezy day tossing your antenna about will continue to be made painfully obvious to the fellow listening to your signal—-the only difference is your warble will be 3 dB louder with the two tubes!

By adding an extra tube(s) as a power amplifier for your basic Hartley, you'll minimize the effects of antenna sway. You'll also make it possible to add vintage AM phone to your 1929 rig at some future time. The handbooks of the era admonished the prospective AMer from attempting to directly modulate a self-excited oscillator due to excessive FMing (or, as they called it then, "wobbulation"). Progressive radio amateurs knew that adopting the master oscillator power amplifier (MOPA) circuit was the best way to add power, stability and flexibility to a self-excited one-tuber.



Schematic of the final amplifier. (Drafting by John Haught)

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Amplifier Background

The little 245 triode always intrigued me because contemporary manuals and spec sheets listed it both as a receiving and a transmitting tube. I was also fortunate in that I had several fine used examples of this venerable bottle at hand, along with matching sockets. These tubes, together with a quantity of other key "period" parts that were available in my junkbox, convinced me that a pair of 245s in parallel (driven by my single 245 Hartley) would be just the ticket for my next foray into the 1929 QSO Party.

The transmitting tube data sheet in my 1938 edition of Jones' *The Radio Handbook* gives the following specifications for a single 245 operating as a class C RF amplifier:

Plate Voltage—400
Plate Current—50 mA
Bias Voltage—200
Grid Current—4 mA
Power Input—20 watts
Power Output—15 watts

The quoted power input/output ratio translates to an optimistic 75% efficiency for the tube—fully twice (and then some) that of a 245 when used as a self-excited oscillator/transmitter. When utilizing hard-to-find old bottles like the 245, why not strive for maximum efficiency? Power output to an antenna is power put to good use; power lost to plate dissipation merely makes a semi-rare (and expensive!) tube heat up needlessly.

Class C parameters were chosen for this very reason, and also because I plan on modulating the amplifier some time in the future. Even the relatively simple Heising AM system requires that the modulated RF stage be run in class C.

There was no question but that the output tank would consist of the classic parallel tuned output arrangement (no pi-network circuitry here!). The large 330-pF Cardwell air variable capacitor that I had on hand, as well as some still-in-the-box Barker & Williamson coil stock, were practically crying out for a deserving application. Happily the sizes/values of these components allowed coverage on 3.5-MHz.

With some padding of the Cardwell by a fixed mica capacitor (see parts list), future 160-meter coverage should also be possible. An alligator-clip-and-tap system would enable the necessary tank coil adjustments.

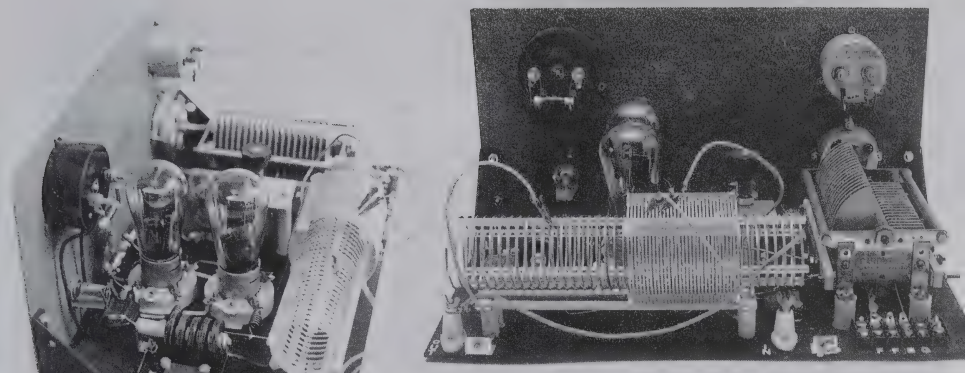
Determining proper plate tuning capacitor and tank coil values for a given band seems like black magic to many experimenters. This certainly does not need to be the case. A review of the 1938 edition of *RCA Air-Cooled Transmitting Tubes* (Technical Manual TT-3) shows that the tank capacitance to achieve a given "Q" may be readily calculated from the formula:

C = 300QI/fE, where
C = total capacitance of the tank capacitor in picofarads
Q = a constant from 12 to 15
I = total plate current in milliamperes
f = frequency in MHz
E = DC plate voltage in volts

A Q of 12 is normally utilized in these applications, with higher values—up to 15—reserved for those instances where plate impedance might be inordinately high. More in-depth reads in the matter of tank Q are readily available in most

PARTS LIST

C1—.001-.005 mFd (not critical), 2.5 kV mica
C2—100 pF air variable (receiver type)
C3—at least 330 pF air variable (Cardwell XP-330-KS or equivalent)
C4—50-pF, 2.5 kV mica added as padder by author (see text).
For 160-meter operation, switch to a 510-pF, 2.5 kV mica.
C5—.001-.005 mFd (not critical), 2.5 kV mica (two needed)
C6—.001-.00f mFd (not critical), 2.5 kV mica
RFC1—2.5-mH, 250 mA (not critical)
RFC2—2.5-mH, 500 mA (not critical)
R1—left section of center tapped filament resistor (not labeled on schematic); 100-Ohm, 1-Watt
R2—right section of above; 100-Ohm, 1-Watt
R3, R4—25,000-Ohm, 1-Watt
L1—10 tpi, 3"-diameter air inductor (B&W 3035, AirDux 2410T, or equivalent). I used a 3" length, but a 2" length should be more than adequate, even for 160-meter work. Tap shown at top (see schematic) is placed about 7 turns up from bottom of coil. Lower tap is placed halfway between top tap and bottom of coil.
L2—6 tpi, 2" diameter, 10" long air inductor (B&W 3025, AirDux 1606T, or equivalent). Tap for best output (see text).



Two rear views of the completed unit. Note meter shunts (left photo). Standoff insulator (right photo) behind the tubes supports neutralizing capacitor.

any of the Bill Orr *Radio Handbooks*.

With the value of C in hand, it is a simple matter to consult the charts in most any of the older *Handbooks* to see what inductance might be required to achieve resonance on the band of choice. I personally prefer using my old ARRL slide rule-style "Lightning Calculator."

Plugging into the RCA formula to find C, I used a frequency of 3.5-MHz, a Q of 12, and an E of 300-volts (as produced by my present power supply). I used a current of 100 mA on the assumption that the two parallel 245s would draw about 50 mA each of plate current as indicated in the Frank Jones handbook. Of course I knew that the draw would be somewhat less with my smaller plate supply, though I didn't know how much less. (Later I measured it at 90 mA.) C was now calculated at:

$300 \times 12 \times 100/3.5 \times 300 = 360000/1050 = 342.85$ pF

This value was close enough to the specs of my 330-pF Cardwell (I eventually added a 50-pF padder across it) and would resonate at the bottom end of 80 meters with an inductance of some 6 microhenries. I made no specific provisions for input tuning. I felt that the integral antenna tuning circuitry of my Hartley, in conjunction with its continuously variable coupling, would afford more than enough flexibility in driving the amplifier. So the input to the latter is strictly "straight through."

Additional flexibility was provided in the arrangement of the grid bias resistors—which makes possible the use of either a pair of 245s, or a single, stand-alone tube. The resistance value for a single tube was calculated using the Frank Jones numbers and Ohm's law:

R = E (bias voltage)/I (grid current in amperes) = 200/.004 = 50,000 ohms

Switching to a pair of 245s (for post-1929 QSO Party activities), the required grid resistance is cut by 50%:

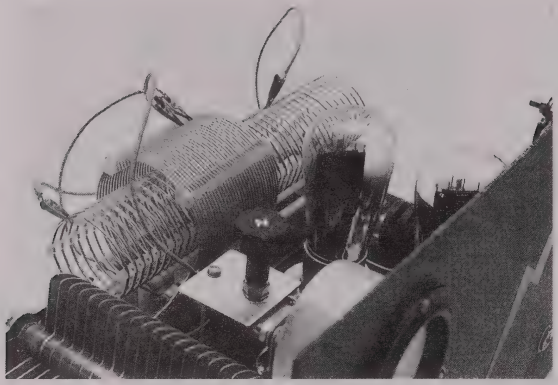
R = E (bias voltage)/I (grid current in amperes) = 200/.008 = 25,000-ohms

Accordingly, two 25,000-ohm resistors are connected in series from chassis ground to the grids. A simple shorting wire, terminated in an alligator clip, allows me to cut out one resistor for single-tube operation. *Note: be sure to have the B+ turned off whenever reaching behind the front panel of your amplifier. Safety First!* So far I have not calculated, or arranged for, the "ideal" capacitance and appropriate inductance for single-tube operation on 80 meters. However, the tank circuit as calculated for two tubes seems to perform well with one.

Both plate and grid currents are monitored. I utilized a homebrewed 300 VDC power supply for the 2000 edition of the 1929 QSO Party, but switched to a 400-volt unit for 2001. A filament supply delivering 2.5 VAC at a minimum of 3 amperes is also required.

Construction

The foundation for the amplifier consists of a 16" × 18" sheet of aluminum, which was folded to form a 16" (wide) × 8" (high) front face, and



Details of tank and antenna coils. Insulated extension shaft on neutralizing capacitor provides safety when adjusting and minimizes hand capacity effects.

a 16" (wide) × 10" (deep) foundation/build area. a pair of right-angle side gussets help to stiffen things considerably.

The circuit is very simple and easy to put together. If you strive to lay out your components such that the input to your amplifier can't effectively "see" the output, you should experience a minimum of problems with its final operation (I'm thinking here of nasty things like unwanted feedback, etc.). The usual admonitions, of course, apply: keep leads short & direct as may be practical; minimize wires crossing overtop of one another, etc. etc.

The tank inductor is mounted atop two parallel quarter-inch wood dowels (see detailed photo of the coil assembly), held in place with a few drops of epoxy glue. The dowels, in turn, are supported above the base by four stand-off insulators. Two additional parallel quarter-inch dowels pass through the tank coil and are glued to the same supports that hold the first two. Spacing between the two sets of dowels is 1⅛". The antenna coil is loose-installed within the tank, resting on the second pair of rods. All of the dowels were treated with two generous coats of clear nail polish to guard against any possible moisture absorption.

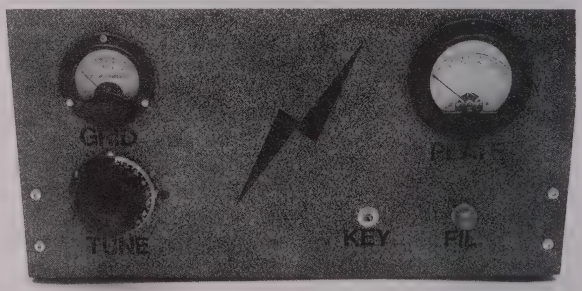
The inductance of the tank is more than enough to permit operation even on 160-meters. Of course, C3 would then have to be padded with an additional capacitor, as represented by C4 on the schematic. This capacitor could be cut in and out with a switch for dual band operation. Manual shorting taps preclude the need for bandswitching the tank coil, and simplify construction considerably.

The front panel paint finish is a story in itself. Repeated efforts at applying a wrinkle finish met with repeated failures. The film build-up after no less than four such ill-fated attempts was so thick that I had to consider whether the panel should be stripped clean for further paint experiments (A most undesirable proposition by that point!). Happily I found a can of so-called "granite-finish" texture spray paint at the local craft shop. A light application of this atop the existing layers effectively hid the mess and resulted in a unique "period" look. The round meters I used also helped with the vintage appearance. I would have preferred that the two meters be a better match, but I decided to limit myself to the contents of my junque box. The vernier tuning dial drive is an E.F. Johnson generously provided by friend Rick, W9QZ. The physical dimensions of the amplifier could have been considerably reduced. However, after having laboured in close quarters before, it was a refreshing change to have room to spare.

Tune-Up

Visually inspect your handiwork before applying any voltages, and compare it to the schematic. That way you should be able to ensure an uneventful "smoke test."

Begin by neutralizing the amplifier. My method may be simplistic, but it is time-honoured, and seems to work well. Leave the tubes in, and apply filament voltage to the amplifier, but no B+. Hook-up your exciter to the input (a short length of coaxial cable will do), and a VTVM to the output (or antenna) terminal. With



Front panel sports craft shop "granite" finish and nifty lightning-bolt logo.

the VTVM set to read 3 VAC maximum scale, turn on the exciter and hold the key down. Slowly adjust the amplifier plate tuning capacitor for a peak on the VTVM.

Now adjust the neutralizing capacitor for a null in the VTVM reading. Re-peak the reading by adjusting the plate tuning capacitor again, nulling it immediately afterward with the neutralizing capacitor. After some 3 or 4 such adjustments, the VTVM reading will remain at zero at any setting of the plate tuning capacitor, and the amplifier will have been neutralized for those tubes installed in it. You will have to go through the procedure again should you change either or both of the tubes.

As always, NEVER "first-time test" any new rig—especially one of these types—on the air. Having established that your 1929-style oscillator/exciter is properly set-up and neutralized, attach a 15-watt light bulb to the output terminal as a dummy load and apply B+. Tune your receiver to around 3570-kHz and key the rig (Note: it matters little if the key is plugged into the oscillator key jack, or that of the amplifier. Since both stages employ 245s fed with the same filament transformer, keying either stage will automatically key the other).

Now adjust the oscillator frequency to the frequency of the receiver. It helps considerably to have a digital frequency counter on the table beside the transmitter to instantly "spot" the transmitted signal frequency. Once detected and verified to be your signal (it shouldn't be too hard to miss—it WILL be loud), dip the final amplifier by tuning the plate tuning capacitor. The light bulb should noticeably increase in brightness upon doing so.

Monitor your signal at all times on the receiver—resonating the amplifier doubtlessly caused the frequency to shift. Bring it back into the receiver pass-band by adjusting the oscillator. Next peak the grid current reading of the amplifier by slowly adjusting the oscillator antenna coupling capacitor and the coupling between the oscillator tank and its antenna coil. Again, monitor the signal, and readjust the frequency of the oscillator to bring it back into the receiver pass-band (such frequency excursions become progressively smaller with each step in the tuning process).

Using a single 245 driver, one hardly needs to be worried about the possibility of dangerously over-driving the grids of the '45s in the amplifier; the only concern here is to maximize the grid current reading—the actual numbers on this meter are merely relative. Likewise, having grown accustomed to commercial tube-type transmitters and the mantra of "minimum loading/maximum capacitance" as the first step in achieving output resonance, it may help to think of the taps on L2 as a sort of "loading capacitor."

Specifically, in your initial tuning exercise, the taps on L2 should be close to the ends the portion of L1 that is in use. This effectively simulates the "minimum loading/maximum capacitance" setting of a conventional pi-network loading capacitor. Initially here, with 260-volts on the amplifier, plate current was less than 50 mA. The dummy load bulb, while lit, was not at maximum brilliance. As the taps on L2 were spread progressively further apart, plate current rose to over 60 mA. and the bulb became considerably brighter.

These techniques may not be startling new for the OT reading this. But they certainly were to a ham like myself, who cut his teeth on DX-60s and the like in the early 1970s.

Operation

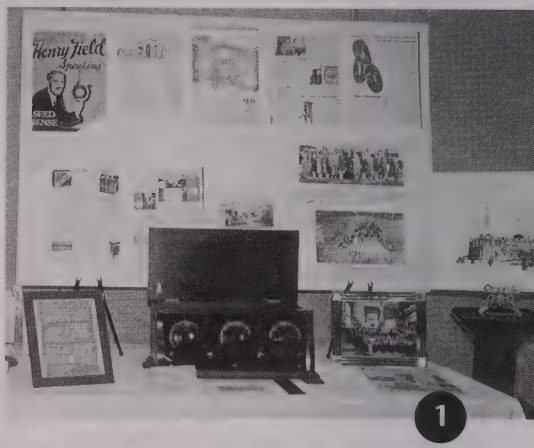
As mentioned, I used this exact MOPA set-up—a single 245 Hartley driving the 2x245 amplifier—in the 2000 running of the AWA "Bruce Kelley 1929 QSO Party." And I was rewarded with a 4th place, finishing with 55 QSOs. (To comply with the rules governing power, one tube was removed, for pre-midnight contacts.) But there is still room for improvement.

While instabilty due to a wind-tossed antenna is now minimized, even the smallest adjustment to the final amplifier affects the frequency. This problem could be alleviated by adding another stage (possibly a 245 run in class A) between the Hartley and the final. In the absence of stiff voltage regulation (was there such a thing in 1929?), separate power supplies for the exciter and amplifier are a must if one wishes to minimize chirp. Frankly I was somewhat taken aback during the course of QSO Party at the amount of "C's" that were post scripted to my received RST reports—but then I measured the plate voltage from my common, choke-input 300 volt supply and was really taken aback! During key up/no load conditions, the supply idled at 320 volts: with the key down, however, the voltage to both the Hartley and the amplifier dropped to 260-volts! This amounts to no regulation at all, and is most assuredly not a good state of affairs for either the overtaxed supply or the quality of my signal.

A new, stand-alone 400-volt unit for the amplifier is definitely in the offing, in spite of conciliatory comments received about my "quaint-sounding" station. *(continued on page 41)*

Selected Contest First Prize

Twenty-three entrants received blue ribbons in the Old Equipment Contest at our 2001 conference. Here's a selection of first-prize exhibits that caught the eye of our cameraman as he strolled through the contest room. The categories in which they were entered are given in parenthesis. (Postponed from our November, 2001 issue in order to make room for the Muchow Auction pictures).



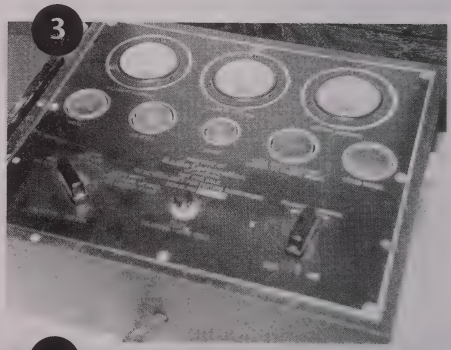
1

1. George Freeman's Henry Field Model 5 (1920s Tuned RF Receivers) tied for first with Mike Batsch's Marconi Model C.

2. Horn speaker entered by Ralph Williams (Speakers—Stromberg-Carlson).

3. Kirk Kline's very rare RCA Radiotron Tube Tester (Test Equipment).

2



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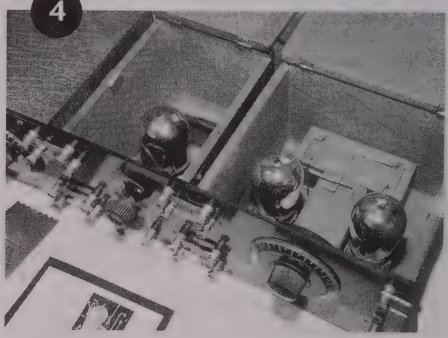


4

Winners

(All photos by Dick Ransley)

4. Mike Batsch's Marconi Model C (1920s Tuned RF Receivers) tied for first with George Freeman's Henry Field Model 5.

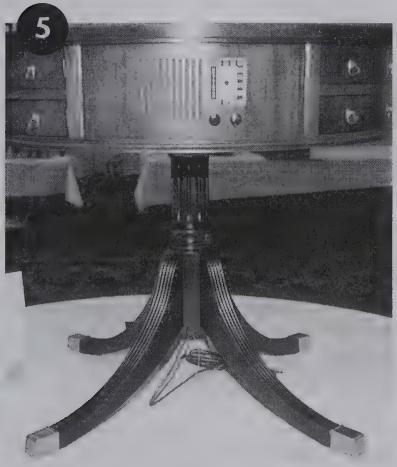
5. RCA Duncan Phyfe radio (Radios in Disguise) entered by John DeLoria.

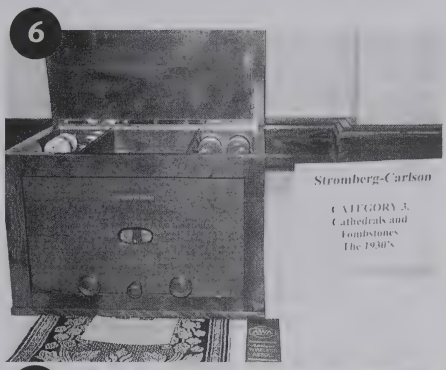
6. Robert Lozier's Experimental Short-wave Converter (1930s Cathedrals, Tombstones, Converters—Stromberg-Carlson).

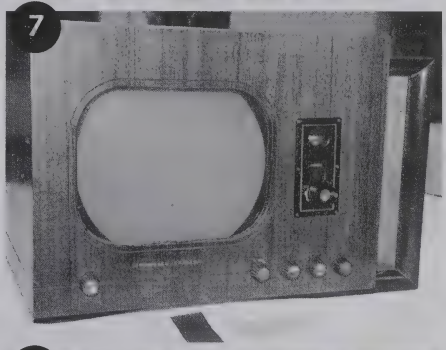
7. Jan and Pete Graves' elegant TV set (Television 1940-1960—Stromberg-Carlson).

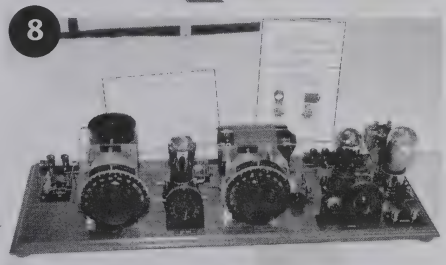
8. Ken Owens' reconstructed Browning Drake Reganaformer set tied for first in its category (New or Rebuilt) and won the Elle Craftsman Award.

9. David Kaiser's 1924 Prototype Portable (The 1920s Battery Sets—Stromberg Carlson) also took both the Best of Show and the People's Choice awards.









BY PARKS STEPHENSON

THE MARCONI WIRELESS INSTALLATION IN THE R.M.S. TITANIC

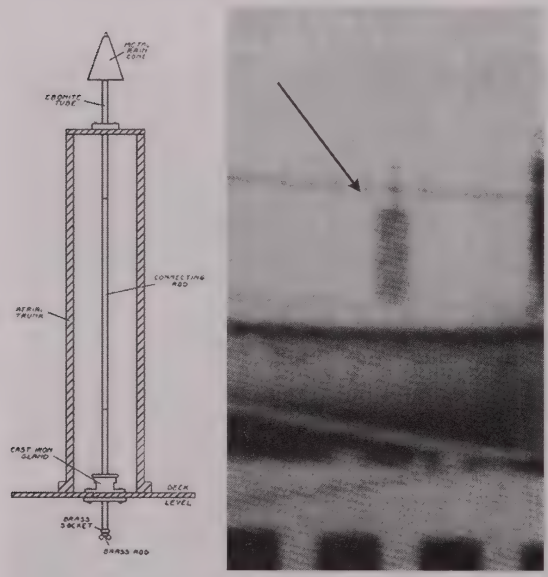
— PART 2 (CONCLUSION) —

Part 1 of this article appeared in our previous issue. As promised in part 1, we're pleased to include author Parks Stephenson's preliminary report on fascinating new details of Titanic's *radio installation videotaped during the filming, at the wreck site, of the documentary* Ghosts of the Abyss *by Director James Cameron. Parks promises us a follow-up article after he has completed a full analysis of the video footage.—mfe*

Aerial

Titanic was fitted with a Marconi twin "T" type aerial, rising vertically from the roof of the Marconi Silent Room, connecting with four horizontal wires strung between the ship's two masts. Positive electrical connection was made between each vertical lead-in and its corresponding wire in the horizontal flat top by means of a McIntyre connector. Two 20-foot spreaders at either end of the flat-top portion spaced the two inner wires 8 feet apart and the two outer wires 6 feet from the inner wires.

The aerial spreaders were supported by bridles of tarred hemp rope (ratline), which in turn could be raised or lowered by rope halyards run through reef blocks attached to the top of their respective masts. The forward spreader had four eyebolts, each of which took an aerial strain insulator, from which an individual aerial wire was run.



Bradfield-type insulator used to insulate antenna from steel hull seen in schematic form (left) and as a blown-up detail from a Titanic photo.

The fundamental wavelength of the aerial was 325 metres, which provided a good value of aerial current at the 600-metre adjustment and a fair value at the 300-metre wave adjustment. Two reasons dictated the aerial's physical length: 1) The aerial could not be reduced to less than one-half its physical length; and 2) Titanic's two masts were stepped approximately 600 feet apart. The length of the horizontal wires was therefore limited to keep the 300-metre radiated wave within limits. This meant that the strain insulators for the after portion of the aerial were suspended over the space between the 3rd and 4th funnels, instead of attached directly to the aft spreader with the remaining wire aft of the insulators serving only as support. Also note that the lead-ins had to be taken from the exact centre of the flat top; otherwise, each branch of the "T" would have a different wavelength, making accurate tuning impossible.

A Bradfield type deck insulator, rated for the 5-kW marine generator

RAYTHEON NAVAL AND MARITIME INTEGRATED SYSTEMS
SAN DIEGO, CA

set and able to withstand a minimum of 30,000 volts, was used to insulate the aerial from the steel structure of the ship. The insulator was elevated on an approximately 6-foot-high wooden trunk, square in cross-section, to keep it clear of a canvas awning that was part of the design for the roof of the Officers' Quarters but never utilised during the ship's short career. In order to protect the Bradfield insulator from the strain of the aerial being pulled by the wind, the lead-ins were firmly attached to a screw eye in the roof of the Officers' Quarters and electrically isolated by a single strop insulator. Electromagnetic energy was transferred between the aerial and the Bradfield insulator by way of two flexible wires that ran from the terminus of the lead-in wires to the insulator's shackle head. The brass terminal socket on the lower end of the insulator rod inside the Silent Room secured the wire connection to the aerial tuning inductance as well as to the two plug sockets mounted on the aft bulkhead of the Marconi Room. The plug sockets were located within easy reach of the operator so that he could switch the aerial from the earth arrestor to the induction coil in the emergency set.

Emergency Set

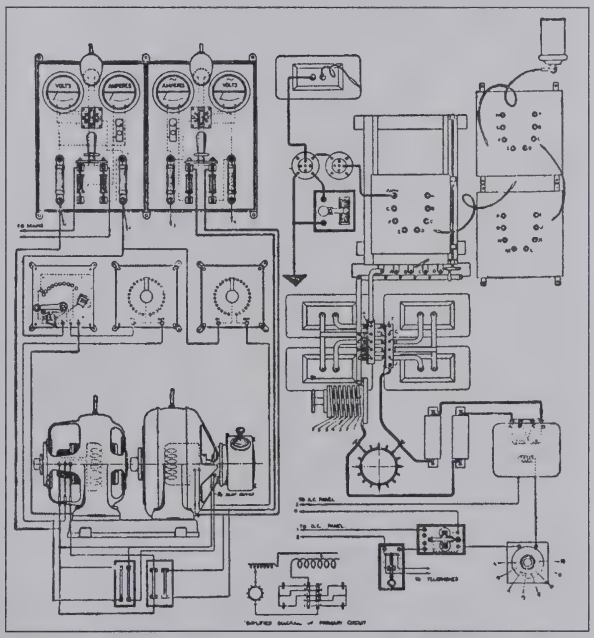
In the event of a loss of power to, or a breakdown of, the main transmitting set, a Plain Aerial Coil Set, capable of producing a plain spark and operating continuously for at least 6 hours, was provided. Eight chloride accumulators were kept in a charged condition by power taken from the ship's mains. A charging switchboard provided status lamps for the charging process and provided the switches needed to reconfigure the system so as to discharge the accumulators to power the emergency set. A 10-inch induction coil induced an alternating current strong enough to jump a plain spark gap, creating a signal that could be heard at least 80 nautical miles distant. A separate manipulating key was connected to the emergency set to control the discharging of the coil.

Ancillary Equipment

Other equipment completed the wireless installation. Pneumatic conveyor tubes transferred Marconigram forms between the Marconi Room on the Boat Deck and the Purser's Enquiry Office on C Deck. Passengers composed and paid for outgoing messages in the Enquiry Office; likewise, incoming telegrams were delivered down to C Deck for pick-up. A shunted buzzer, galvanometer, and portable wavemeter were included along with a special tool kit to test and adjust the circuits.

Summary

Unfortunately, not much remains of *Titanic*'s wireless installation today. The aerial was swept away when *Titanic*'s two masts were dislodged during the sinking. Photographs taken of the wreck soon after its discovery in 1985 show only the bent insulator connecting rod protruding from the gland mounted on the deck, surrounded by the square outline left by the caulking once used to seal the base of the now-absent aerial trunk.



Interconnection diagram for a 5-kW Marconi marine wireless transmitting installation. The Cameron video footage confirms that this is the design used on Titanic.

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Cameron Expedition Update

In September 2001, James Cameron explored the wreck of *Titanic* using advanced technology hitherto unavailable to underwater explorers. Prior to the expedition's departure, I had briefed Cameron on what he could expect to find in the wireless rooms, and in response he devoted portions of two separate dives to fully exploring the area. One major discovery made during his interior exploration of the superstructure was that most wooden walls inside the ship have been eaten away by the organisms that inhabit the wreck. The Marconi suite is no exception—there remains only one fragment of the wall that separated the Marconi Room (where the operators worked the receiving equipment) from the Silent Room (the insulated room where the noisy transmitting equipment was located). The lack of obstruction afforded Cameron the opportunity to explore and record the remains of the entire Marconi wireless installation.

In the Marconi Room itself, absolutely nothing appears to be standing. It is a wasteland of accumulated silt, with the occasional hump hinting at perhaps some object beneath. There are a few wires and switches emerging from the muck, and the ship's electrical distribution box that once routed D.C. power to the Marconi set still hangs from the overhead by its heavy cabling. Just a few feet to port, however, there is a collection of equipment that would make even the most casual wireless enthusiast giddy with excitement.

The entire transmitting set is virtually intact and still in place. The 5 kW motor-generator, with lifting rings on top and disc discharger mounted on the alternator end, is oriented fore-and-aft and sits in front of a rare section of surviving wall. This wall evidently survived because of the large number of metallic objects affixed to it (as found throughout the interior of the wreck, toxins released from corroding metal served to preserve any wood in immediate contact with it).

The field regulators for both the motor and alternator are still mounted to this wall just above the motor-generator (in *Titanic's* elder sister *Olympic*, these units would be found next to the operator in the Marconi Room). The regulator control handles still point to the last settings made by either Jack Phillips or Harold Bride to produce a properly quenched spark as the ship's power was failing.

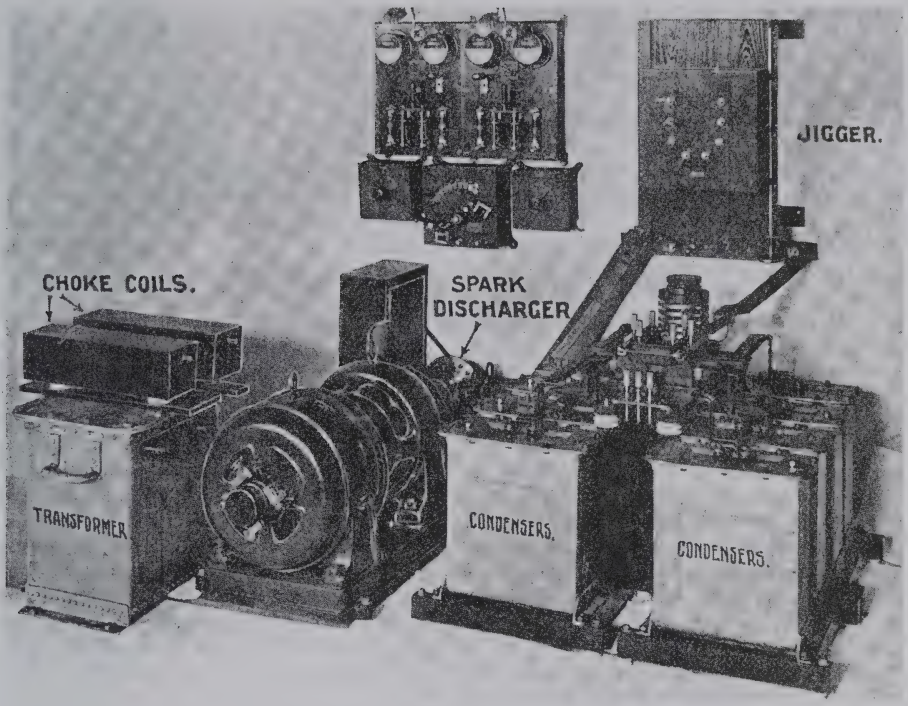
The condensers, Swiss commutator, choking coils, transformer, and other equipment cabinets are also in evidence. The heavy H.F. spiral inductance coil lies upended on top of the commutator. The earth arrester spark gap and tuning lamp are suspended in space by the wires that connected them into the receiver and earth circuits, despite the fact that the wall on which they were originally mounted has disappeared. These two units, considered a part of the receiver circuit, were mounted in *Olympic's* Marconi Room, so it was surprising to find them in the remains of *Titanics's* transmitter room.

The brass pneumatic message tubing that carried Marconigram forms between the Marconi Room and the Purser's Enquiry Office on C Deck was found dislodged and lying in the sediment forward of the Silent Room. Another section of tubing, this one still in place, was observed behind a section of deckhouse outer wall that was starting to peel away on the starboard side of the Boat Deck.

I have not yet viewed all the footage shot in the remains of the Marconi suite. What I describe here is based on a viewing of a portion of the video which raised as many questions as it answered. What I *can* determine at this point is that the Marconi equipment layout in *Titanic* was radically different from that photographed in *Olympic*. Other differences from the elder sister ship were found elsewhere, and this came as a surprise to historians, who have always used the extensively-photographed Olympic as guide to *Titanic's* internal appearance.

Once I have had the chance to view all the footage, I will summarise the findings in a follow-on article in *The OTB*. I wish to give my heartfelt thanks to Ken Marschall for his description of Cameron's interior exploration and for working with Ed Marsh of Earthship Productions to help release portions of the unedited video for post-production analysis. Ken's fascinating account of the expedition's finds while making Cameron's *Ghosts of the Abyss* (working title for a 2002 release) documentary can be found at: http://home.flash.net/~sparks12/titanic.html.

Parks Stephenson
December, 2001



Wireless transmitting set identical to that installed aboard Titanic.

More recent video footage shows that the remains of the previously observed metal rod are now missing, either corroded away or knocked off by a visiting submersible. Footage of the interior of the Marconi Room to date has revealed only the electrical distribution box that was mounted on the forward wall, still hanging by the heavy wires that carried power from the ship's lighting circuit to the Marconi switchboard.

No other equipment has been found although James Cameron will be attempting to explore the interior of the Marconi and Silent Rooms in the course of filming his documentary, "Ghosts of the Abyss," in September, 2001. As far as can be determined at this time, however, there is not much remaining of the apparatus that alerted the world to Titanic's plight and, in so doing, saved the lives of over 700 people.

Acknowledgements

The author wishes to acknowledge the contributions of the following people: Ken Marschall, who provided invaluable assistance in supplying and deciphering photographs showing the aerial connections of both Olympic and Titanic; Bill Sauder, who reviewed the draft and provided much-needed technical advice; Eric Sauder, who reviewed the draft for the proper historical perspective; Tom Perera, editor of *The AWA Review*, who encouraged me to post this excerpt on his website and is helping to bring my wireless research to publication; and Jim Kreuzer of New Wireless Pioneers, who has helped me with key resource material on Marconi marine sets over the past year or so. Without their help, I could never have come close to understanding Titanic's true Marconi configuration.

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(continued on page 41)

EQUIPMENT RESTORATION

EDITED BY **KEN OWENS**, 478 SYCAMORE DR., CIRCLEVILLE, OH 43113
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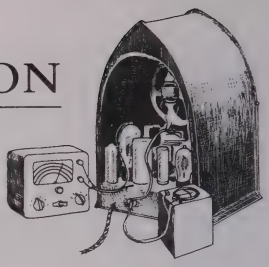
PLEASE SEND CORRESPONDENCE DIRECTLY TO THE ABOVE ADDRESS,
INCLUDING SASE FOR REPLY.



Gems from Back Issues of *The OTB*

Don't forget that answers to your questions area available at the e-mail address above.

Alton DuBois says he got the model number transposed on the Sparton he reported on last time. It was a Model 69, not 96. I missed that one too; there was no Model 96.

Back issues of *The OTB* are available on two CD-ROM disks (ordering information in the Museum column). They cover from Vol. 1 through Vol. 37 (Jan 1960-Nov 1996). I have been reviewing these disks for material which might be worth reprinting or excerpting. There is a lot of useful information here.

Some ideas are so simple that you kick yourself for not thinking of them. One of the best I've found in an old publication came to me from a Hints & Kinks column in a 1930s radio magazine. The author suggested installing a light on the underside of the workbench so that parts dropped on the floor could be found. I immediately got a 15W fluorescent fixture of the kind you put under kitchen cabinets to illuminate the counter and fastened it under the bench. No more hunting for the flashlight when things roll under the bench.

♦ ♦ ♦ ♦

Here is a tip from Tim Walker, N2GIG, from the Feb 1987 issue. He cleans aluminum variable capacitors by stewing them for a couple of hours with old tomatoes from the garden, skins and all, in a steel pot. After a thorough washing, he says the results are amazing — much better than vinegar. Anyone game to try it?

♦ ♦ ♦ ♦

Early issues of *The OTB* carried a lot of news about AWA activities and the most recent acquisitions of members. Feature articles tended to be of historical rather than technical interest.

In Vol. 2, No. 3 (mid-year, 1961), *OTB* Founding Editor and long-time museum curator Bruce Kelley (W2ICE), now a silent key, reported the results of a survey among collecting members to establish the values of old equipment. He reported minimum-maximum values for sets in average and good condition. The numbers will make you want to cry.

The maximum value for a Marconi 106 receiver (good) was $45. One sold in the 2001 Muchow auction for $15,000 and another sold in a summer, 2001 Estes auction at Medina, OH for $22,000. Atwater Kent Model 10 breadboards were valued at $21.50 and spherical audions at $21.30. Why wasn't I collecting then?

♦ ♦ ♦ ♦

In the Feb 1960 issue (Vol. 1, No. 2), Bruce described three classes of collectible broadcast receivers. His ideas for what the collector should seek are as valid today as they were 42 years ago. Prices the collector should expect to pay have changed somewhat. Here is his article exactly as he wrote it.

Collecting Antique Broadcast Receivers
By W2ICE

The collecting and restoring of early commercial made broadcast sets is a relatively easy and inexpensive field for the newcomer interested in starting a collection. Unlike amateur and commercial gear which has a historical span of over 40 years, historical broadcast equipment is confined within a period of only 10 years - 1921 until about 1931. However, within this short period of time, tens of thousands of receivers were made and with a little patience one can build up a nice collection by scrounging through attics and second hand stores. Broadcast sets are in 3 historical groups:

Antique—1921 thru 1923

These are the first receivers offered to the public when broadcasting was in its infancy —

the amateur was still operating around 200 meters and in many incidents was the local broadcaster! A well rounded historical collection should include at least one receiver made by Westinghouse, General Electric and Wireless Specialty for RCA under RCA patents. These receivers were manufactured before RCA started to make their own products. You will find the one most difficult to obtain will be the one manufactured by Wireless Specialty Apparatus Co. for RCA. (a tip—it might be a crystal set in a metal box).

The easiest to find toward the end of this era will be, of course, RCA's own product—the Radiola III or III-A using WD-11 tubes. Another well known receiver about this time that the collector should have is one of the several models of the Atwater Kent breadboard sets using UV-201's or the Westinghouse Detector and 2 step job in the "R" series.

Vintage—1923 thru 1927

This is the period between early broadcasting and the A.C. receiver. It would be impossible to cover the dozens of manufacturers of this era. Suffice it to say, the author feels that the collectors should try and find a few of the notables such as the Fada "One-Sixty" or a Stromberg-Carlson neutrodyne, an early Crosley, a Freshman "Masterpiece" or a Grebe "Synchrophase", and last but not least, one of the famous RCA superhets using the catacomb and UV-199 tubes.

Classic—1927 thru 1931

This represents the end of a great era. Several manufacturers made huge semi-custom built receivers such as Scott, Silver-Marshall, Remler, etc., all of which were ultimately replaced by mass production receivers without individuality!

Thru these ten years of course, there were "gems" which never should be overlooked if they can be found…these include the Federal, Zenith, Kennedy, Leutz, Norden-Hauck, etc. With the exception of the last few, most of the receivers mentioned in this article are not worth over $5.00, in fact, a dollar or two would be considered a reasonable figure.

1929 AMATEUR RADIO STATION, *continued from page 33*

Conclusion

It's remarkable how building something as "retro" as a rig like this can seduce one into cracking open the books and absorbing hitherto unknown electronic design concepts. Through this marriage of theory and practical application, you find yourself walking in the footsteps of Ross Hull, George Grammer, and other true giants in the development of radio state of the art. So enjoy the view from up there—you're in good company!

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KEY AND TELEGRAPH

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PLEASE INCLUDE SASE FOR REPLY.

Bunnell vs. Bunnell

Did you know that at the beginning of the twentieth century, there were two separate Bunnell companies competing against each other? You may have encountered on occasion the curious markings "Bunnell Tel. & Elect. Co." inscribed on some Bunnell instruments. It seems that there has always been somewhat of mystery associated with this anomaly. Why would Bunnell go to all the trouble of marketing the same products using another name? All the theories of a spin-off company, or a subsidiary for specialized markets, never seemed to add up.

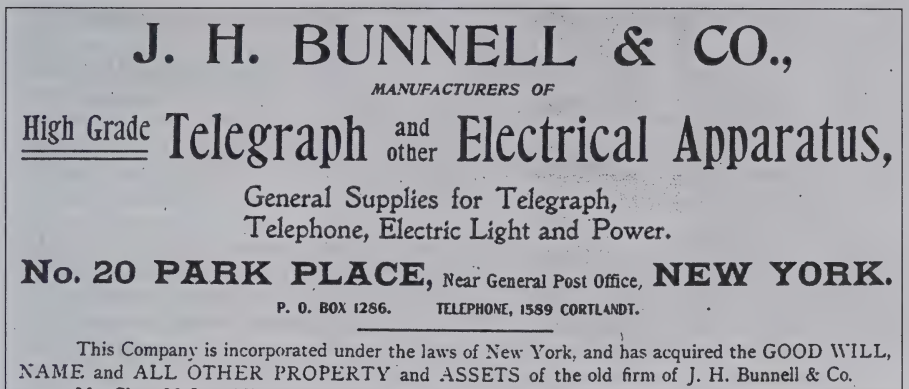
The formation of J.H. Bunnell & Company in 1879 was by a partnership between Jesse H. Bunnell and Charles McLaughlin. History seems to have forgotten McLaughlin and his role in the success of the Bunnell Company. However, like Jesse, he was a former telegrapher and had a strong background in the construction of commercial and private telegraph lines. He entered the business in 1863 and spent some of his early years constructing the first telegraph lines in Florida, with the goal of connecting them with a cable to Cuba.

He first met Jesse Bunnell in 1876, when McLaughlin was in Philadelphia as a representative of a New York manufacturing concern. Three years later they became partners in the New York company J.H. Bunnell & Company. As partners, they complemented each other very well but operated independently. Jesse's heart and soul was in the manufacturing aspects of the company whereas McLaughlin's interests concentrated on commercial sales and general operations.

Bunnell Telegraphic and Electric Co. identification marking on an aluminum lever sounder.

Jesse passed away on February 8, 1899 at age 56, which made McLaughlin the sole surviving partner of the firm. Uncertainty existed as to the future of the Bunnell company after Jesse's death. McLaughlin was quick to reassure the telegraph world by placing ads and business notices stating that their factory was crowded with new work and that business was going to continue as normal.

A few months after settling Jesse's estate, on October 4, 1899, McLaughlin and four others filed to incorporate J.H. Bunnell & Co. in the State of New York. Start-up capital was $50,000 and 300 shares of stock were issued—Mclaughlin holding majority ownership with 170 shares. Other major stockholders included Mclaughlin's son William and veteran Bunnell inventor John


J. H. BUNNELL & CO.,
MANUFACTURERS OF
High Grade Telegraph and other Electrical Apparatus,
General Supplies for Telegraph,
Telephone, Electric Light and Power.
No. 20 PARK PLACE, Near General Post Office, NEW YORK.
P. O. BOX 1286. TELEPHONE, 1589 CORTLANDT.
This Company is incorporated under the laws of New York, and has acquired the GOOD WILL, NAME and ALL OTHER PROPERTY and ASSETS of the old firm of J. H. Bunnell & Co.
Mr. Chas. McLaughlin, the surviving partner of the late firm, and its active manager from the beginning, is at the head of this Company.
We have moved from 76 Cortlandt Street. Please note that our NEW PLACE is No. 20 PARK PLACE (between Broadway and Church Street), and NO OTHER PLACE.
Eastern Agency for "Orient" High Grade Incandescent Lamps. Catalogues Free.
J. H. BUNNELL & COMPANY,
Electrical Manufacturers, 20 PARK PLACE, NEW YORK.

J.H. Bunnell Ad. of May, 1900 not-so-subtly attempted to differentiate the firm from its "upstart" competitor.

Ghegan, each owning 50 shares.

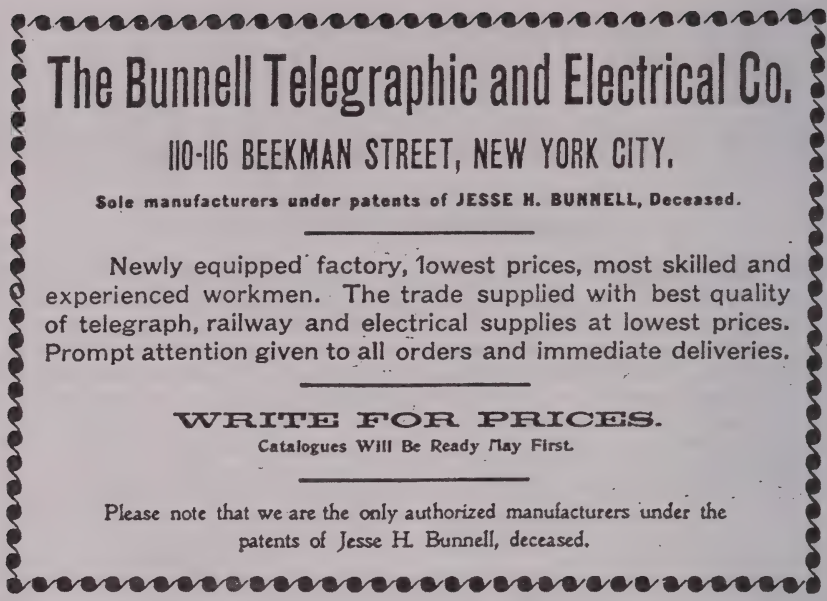
Mclaughlin's move to incorporate a "new" J.H. Bunnell Co. did not sit well with the Bunnell family. Although the family had possession of Jesse's patent rights, they could not stop the surviving partner from continuing to operate as J.H. Bunnell & Co. The family countered this by incorporating their own company and on January 27, 1900 The Bunnell Telegraphic and Electrical Company was formed with a start up capital of $200,000. Jesse's estate had provided $30,000 to his wife and $270,000 to a trust set up for his four children. Three of the five incorporators, owning 96 percent of the company's stock were Bunnell family members: Mary Bunnell (Jesse's widow), Dewitt Bunnell (Jesse's eldest son), and Albert Wise (Jesse's son-in-law), who held the majority ownership with 61 percent. The new firm set up sales and manufacturing operations at 110-116 Beekman Street in New York City.

On February 10, 1900, the date the announcement of the new Bunnell Tel. & Elect. Co. appeared in the trades, Mclaughlin gave notice that because J.H. Bunnell & Co. had "grown to such proportions" they had decided to move into a larger facility, leasing 20 Park Place in New York City.This new location gave the company a five story building, plus basement and sub basement, for their offices, show rooms, and warehouse.

The competition between the two companies first came to a head on March 20, 1900 when both firms ran full-page ads on opposite pages in *Journal of the Telegraph*. The J. H. Bunnell & Co. ads claimed: "We own the Good-Will, Name, Copyrights, Trade-Marks and all other assets of the old firm of J.H. Bunnell & Co. and propose to maintain our rights in the premises. Attention is called to these facts so that liability may not be incurred by dealing with unauthorized concerns."

The Bunnell Telegraphic and Electrical Co. ads stated: "Don't be misled by evasive statements, and buy inferior goods, purporting to be manufactured under our patents. All patents of Jesse H. Bunnell, deceased, are owned and retained by his estate, and we are the only firm authorized to manufacture thereunder." The new company also made 40 to 50 percent price reductions in he price of their steel lever keys and aluminum lever sounders in an attempt to lure customers from J.H. Bunnell & Co.

The competition continued elsewhere too. There were trade shows in 1900 not unlike the ones that exist today. At a typical show for railroad telegraphers and buyers, there would be a booth set up by J.H. Bunnell & Co. and manned by Charles McLaughlin and John Ghegan. Further down the aisle there would be a Bunnell Telegraphic & Electrical Co. booth manned by Dewitt Bunnell. At times he would be assisted by his mother Mary, who was a familiar sight at


The Bunnell Telegraphic and Electrical Co.
110-116 BEEKMAN STREET, NEW YORK CITY.
Sole manufacturers under patents of JESSE H. BUNNELL, Deceased.
Newly equipped factory, lowest prices, most skilled and experienced workmen. The trade supplied with best quality of telegraph, railway and electrical supplies at lowest prices. Prompt attention given to all orders and immediate deliveries.
WRITE FOR PRICES.
Catalogues Will Be Ready May First.
Please note that we are the only authorized manufacturers under the patents of Jesse H. Bunnell, deceased.

The new Bunnell company placed this ad in April, 1900, soon after opening for business.

the shows. The two companies even competed in having the best complimentary handouts.

The management team at J.H. Bunnell & Co. was very solid. Mclaughlin continued to use his expertise with commercial sales customers and John Ghegan essentially filled the role once held by Jesse Bunnell. Inventor Ghegan had the necessary technical expertise and was well respected by the telegrapher and railroad communities, His fluency in Spanish help the firm establish permanent business ties in Central and South America.

Management at The Bunnell Telegraphic and Electrical Co. was not as strong. The President was 31-year-old Yale graduate Albert Wise. In addition to his responsibilities at Bunnell, Wise continued to maintain his lucrative New York corporate law practice. General Manager Dewitt Bunnell was only 23 years old. Dewitt's career was tragically cut short during the first year of the company's operation; he died of typhoid fever in November, 1900. What the company *did* have, however, was plenty of capital and a loyal group of skilled and experienced workers at the manufacturing level.

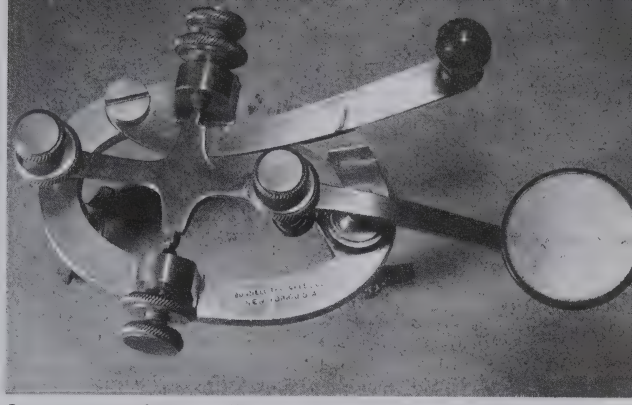
In 1901, both companies made major improvements in their manufacturing capabilities. J.H. Bunnell & Company's Canal Street factory was damaged by fire early that year, which caused temporary delays in filling orders. The firm built a larger factory at 5 through 15 Sullivan Street in New York City and equipped it with new machinery capable of increased production. The new facility began operations in May of 1901.

Within a few weeks of the opening, The Bunnell Telegraphic and Electrical Co. announced it had purchased the entire business and factory of The National Electric Manufacturing Company in Milford, CT. This facility, which was already set up to produce district and fire alarm call boxes and registers, included a foundry and japanning plant. The Bunnells remodeled the factory and upgraded its machinery, and claimed they could now produce 700-800 instruments daily. They expanded their New York manufacturing operations to include the building at 120 Beekman Street. A painful side note: about this time, the firm purchased about 100 retired, weight-driven registers from the Philadelphia, Reading, and Pottsville Telegraph system and used them for scrap! (Though a few of were nickel plated and kept as "ornaments.")

In September of 1902, Albert Wise approached Charles McLaughlin and made an offer to buy his majority share of J.H. Bunnell & Co. The offer was he accepted. The reason Wise made the offer at this point is unclear, except that the timing may have been right. McLaughlin was now 59 years old and had just lost his wife. The

merging of the two companies took several months, and at its completion McLaughlin went into retirement.

By the summer of 1903, Albert Wise was president of J.H. Bunnell & Co. He wisely decided to make John Ghegan his vice president and, more importantly, the general manager of the company. Unfortunately, Wise's tenure as president was short-lived. In December of 1903 Wise, then 34, died from complications resulting from a trolley accident. Ghegan then became president.



Instruments with "Bunnell Tel. and Elec. Co." markings like those on this steel lever leg key can be dated between 1900 and 1904.

The consolidation resulted in a greatly improved manufacturing structure for J.H. Bunnell & Co. After mid 1903, their ads mention three factories: 5-15 Sullivan Street and 110-120 Beekman Street in New York City, as well as the Milford, Ct facility. At the first post consolidation board of directors meeting of J.H. Bunnell & Co. in March of 1904, new officers were officially elected. They included: John Ghegan as president, Charles Graham (who was the head of an extensive foundry in New Haven, Ct.) as vice president, and Charles Merritt as treasurer. Merritt was the former "Tel. & Elect." treasurer and, like Ghegan, was a well respected old time telegrapher with roots established working the cable at St. Pierre and Miquelon.

Telegraph Age spoke highly of the company's new directors:

These eminently practical men form probably the strongest combination ever established in this country for the manufacture of telegraph apparatus.

This opinion was based in part on the board's inclusion of one additional director not yet mentioned. His story makes an amazing footnote to this chapter of the company's history. The 1904 announcement of the new officers states that the officers "together with Jesse H. Bunnell" constitute the board of directors. Much of the record of Jesse's youngest son's life has been lost. But we do know that Jesse H. Bunnell Junior was 22 at the time of his election to the board. He had already worked in the company's factories for several years, at first with his father. He was said to have closely resembled his father in size and appearance.

In the years following the consolidation, Jesse Jr. played a role in company's manufacturing operations and, based in Milford, he worked at both the Sullivan Street and Milford, Ct. factories. Unfortunately, the men in the Bunnell family seem to have been cursed with short lives. In 1912, at age 30, he was taken ill on a train returning to New York from California and was removed to a hospital at La Junta, Colorado, where he died. The vague and almost cryptic reports about his passing in East Coast papers prompted me to research further out west. It turns out that young Jesse had been influenced by the wrong crowd while in California and was experimenting with cocaine and opium. His death was caused by a drug overdose. One can only speculate what the fate of J.H. Bunnell & Co would have been if he were to live a longer life.

SOURCES

City directories, Brooklyn, New York, 1899-1913

City Directories, Manhattan, New York, 1899-1906

Electrical Review, 3-25-1899, 5-16-1900, 11-14-1900, 4-27-1901, 5-11-1901, 7-13-1901, 10-5-1901, 6-26-1902, 9-27-1902, 1-24-1903, 12-19-1903

Electrical World & Engineer, 3-11-1899, 2-10-1900

Telegraph Age, 2-16-1899, 3-1-1900, 7-1-1900, 11-1-1900, 6-16-1902, 1-16-1903, 12-16-1903, 1-16-1904, 3-1-1904, 3-1-1905, 3-16-1907

Telegraph and Telephone Age, 5-16-1912, 5-16-1916, 12-1-1916

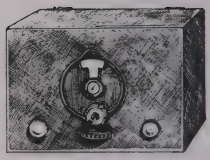
Journal of the Telegraph, 3-20-1900, 2-20-1904

La Junta Tribune, 3-11-1912

Certificates of Incorporation, N.Y.S. Dept. of State, Albany, N.Y.

AMATEUR RADIO

EDITED BY **JOHN F. ROLLINS, W1FPZ**, HC 33, BOX 150, ARROWSIC, MAINE 04530
PLEASE INCLUDE SASE FOR REPLY.



1929 QSO Party Results—Annual OT DX Contest Announcement

QSO Party Results
By John F. Rollins, W1FPZ

The Bruce Kelley Memorial 1929 QSO Party was held during the first and second weekends in December 2001. Judging from reports from hams around the country and Canada, conditions for the event were excellent, no QRM and excellent propagation. On the negative side, participation appeared to be down. Seventy two operators were accounted for and it is estimated that another five or ten were active. Only 58 logs have been received but judging by enthusiastic comments and notes received, a good time was had by all.

A number of east-west contacts were made although Hank, W6DJX, observed that there were no East Coast contacts made after midnight (West Coast time). Rick, W9QZ, in Indianapolis wrote enthusiastically that he made a two-way contact with Bill, K6TQ in California followed by another with Carl, W1NV, in Maine. Shades of the early days of radio! Good going Rick.

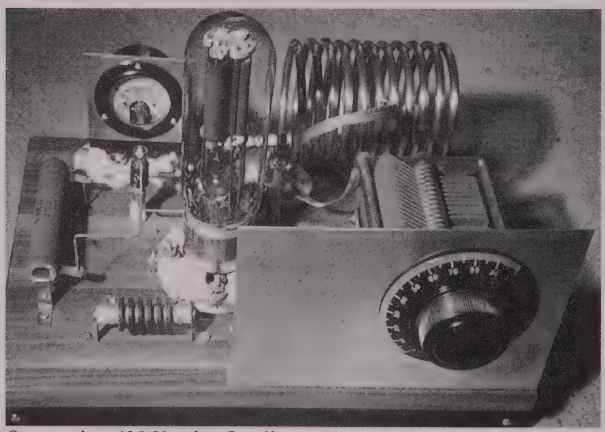
Bob Raide, W2ZM, maintained his stellar performance by garnering the most contacts with a total of 62 QSOs. Can't any of you guys beat him? Eddy, VE3CUI, reported that from his logs the following types of 1929 or earlier transmitters were in operation:

Hartley 22	(37%)
TNT 9	(9%)
Modern 9	(15%)
MOPA 13	(22%)
TPTG 5	(8%)

Use of MOPA transmitters continues to increase, but the Hartley is still the favorite. I heard some fine signals from all four types. Speaking of signals, a couple of the participants received Official Observer reports. I am not sure what to do about these reports. Sure, there are some chirps, yoops and buzzes which can occur from the early type transmitters. I shall explore this problem with the ARRL. I can't believe that we are causing serious problems for communications from our low power rigs operating for a two-day annual event.

Jim, K1TMJ, writes that he received an OO report from an observer in Ohio who gave him an RST of 564. I recalled my QSO with Jim and I had noted "5NN, vry clean OC." I looked through a number of logs of hams who had contacted Jim. All reported 599 or 5NN. So I don't know where that OO got his 564 from.

That about wraps it up for this annual event. Your notes and pictures are always greatly appreciated. We certainly have some master craftsmen in our AWA group. 73 and hope to hear from you on the upcoming Linc Cundall Contest and then in April for the 40 and 20 meter OT DX test. *Best 73, John*



Outstanding '29 Hartley Oscillator, Using a 211 tube, built by Henry Meyer, W6TDP.

THE TOP TEN SCORES

Call	Contacts	Call	Contacts
W2ZM	62	W5WS/3	43
W2IRS	56	K3DZ	42
VE3CUI	56	WA3FFC	37
KJ8L	54	N9AHQ	37
W2AO	47	N2VO	34

COMPLETE PARTICIPANT LIST

	Call	Transmitter	Power	QSOs
W1	WIDDW	29 Hartley UX 112A	10	28
	KIDGH	29 Hartley 45	7	17
	WINV	29 Hartley 45	10	26
	NE1S	29 TNT, PP45s	10	31
	WIYT	29 TNT 45	5	20
	WITSP	29 Hartley 45	10	25
	KITMJ	29 Hartley		35
	WIMCG	29 Hartley		5
	KA1CFQ	29 Hartley 45		11
	WIGIG	29 TPTG 45		19
	WIFPZ	27 MOPA 210s	10	23
W2	W2TM	29 MOPA 210s	10	19
	W2DGB	29 Hartley		7
	KE20	29 TNT	5	26
	W2YIK	29 Hartley 45	6	24
	W2TWW	29 TNT 01A	4	14
	W2ER	29 TPTG PP10s	10	18
	W2IRS	29 Hartley 203	10	56
	W2HBE	29 Hartley 45	8	19
	N2VO	29 Hartley		34
	AA2CU	29 Hartley 45	9	14
	N2YR	29 Hartley 45		1
	W2AO	29 TNT 210	5	47
	W2ZM	29 Hartley 45	10	62
	W2LID	MODERN		27
W3	WA3FFC	28 MOPA	10	37
	KD30R	29 Hartley 510	10	29
	W5WS/3	28 MOPA		43
	K3DZ	27 MOPA	9	42
	W3FJJ	29 Hartley 45	10	17
	W3VVS	29 Hartley 210	9	23
	WB3HLH	29 TNT	9	22
W4	AA4RM	29 Hartley	9	27
	W4AWA	29 Hartley		28
	K4LJH			ILL
	W4VBX	29 TNT 210		17
W5	K5RB	29 MOPA	10	21
	AC5AM	28 MOPA	10	29
W6	K6TQ	29 TNT 210	10	20
	W6DJX	29 TNT 210	10	16
W6TDP		29 Hartley 211	10	6
W7	W7DRA	29 TNT PP211	10	4
	W7LNG	25 Hartley 203A	10	14
	W7LOG	29 TNT	9	1
	W7QQ	29 PPTPTG 27s	10	10
W8	K8JWR	29 MOPA 27/27	10	26
	W8KGI	28 Hartley 10	10	15
	KJ8L	27 MOPA, 22 TPTG 201A		54
	NI8G	29 TPTG PP45s	10	19
W9	N9AHQ	29 MOPA	7	37
	W9QZ	29 Hartley		22
	AA9DH	29 Hartley 10	10	19
W0	AB0CW	29 Hartley 10	5	13
	KB0ROB	29 Hartley 10	10	20
VE	VE3RSA	29 Hartley 71A	5	30
	VE3BBN	29 Hartley		13
	VE3CUI	29 Hartley 45 to PR 245s	10	56
	VE3DKW	29 MOPA 45,210	10	35

The 2002 Linc Cundall Memorial OT DX Contest
By Randy Haus, KB2PLW

A Memorial to Linc Cundall W2LC

The annual OT DX Contest will take place in April, 2002. This contest, held on 40 and 20 meters, gives the West Coast and DX Old Time operators a more favorable chance to compete and accords higher point earning status to the great rigs and circuits of the 1950s and earlier. In checking the comprehensive contest listings maintained by Bruce Horn, WA7BNM, at calendar@hornucopia.com, I found that the dates below are virtually the only ones available in April where we can avoid "crashing" into the CW portions of major contests. The 2001 OT DX contest was a great success, and I received several letters about how much fun was had. Again, equipment or circuits designed before 1960 will be counted as OT gear in scoring. Logs will be sent out to regular AWA contest participants during the second week of March, 2002. As always, there may be some omissions, so if you don't receive an OT DX Contest Log

by March 15, 2002 (or if you are a first-time entrant), please write to Randy Haus KB2PLW, P.O. Box 665, 303 Pennsylvania Avenue, Trumansburg, NY 14886.

• *Dates and Times:* 2300UTC Wednesday to 2300UTC Thursday (April 3-4) and 2300UTC Saturday to 2300UTC Sunday (April 6-7), 2002.

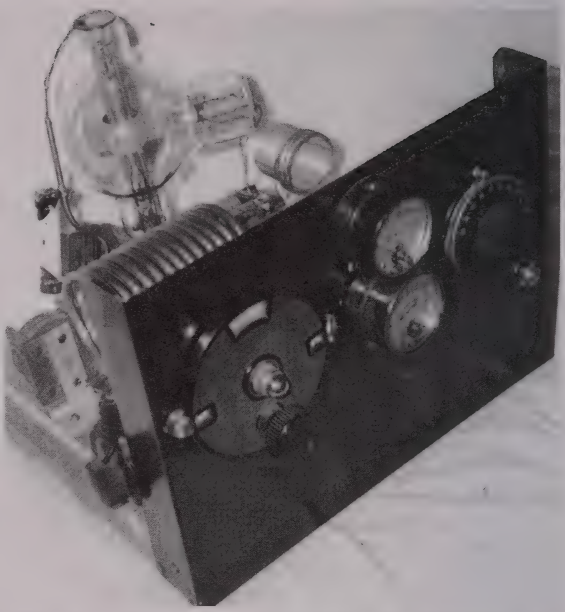
• *Objective:* Contact the greatest number of AWA members. When calling, use "AWA AWA AWA de KB2PLW," as an example. Once contact is made, exchange year of equipment such as "TX 55" for a 1955 transmitter and "RX 38" for a 1938 receiver. Send "MOD" for 1960 or later gear.

• *Rules:* A station will be scored only once on each band. Non-member contacts and stations not submitting logs will not count.

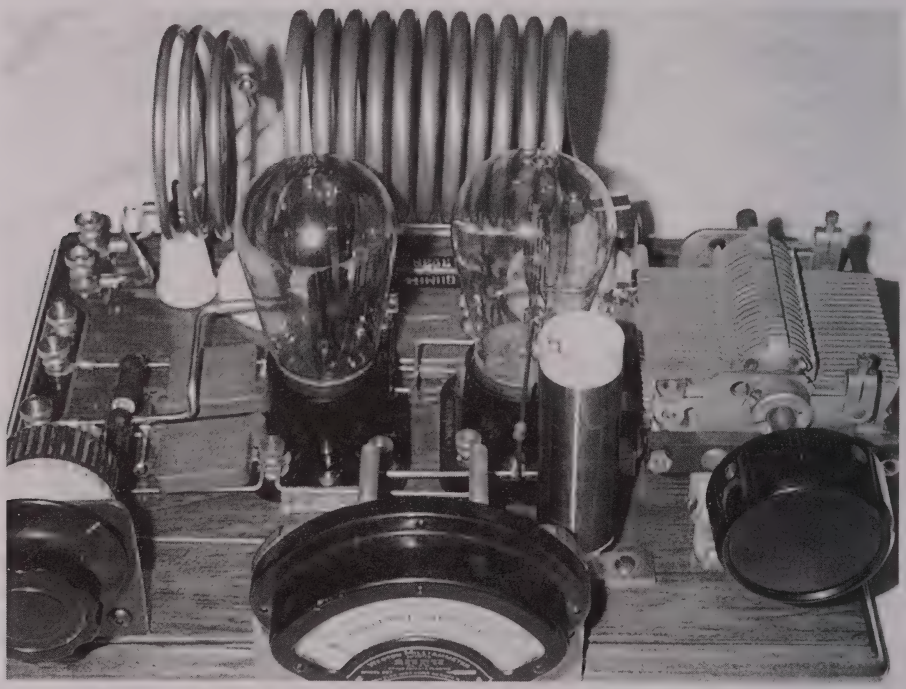
• *Frequencies:* 7030-7050 kHz and 14050-14075 kHz, +/- QRM.

• *Scoring:* QSO Zones: "E" east-

(continued on page 50)



Unusual Colpitts TPTG oscillator with a type 860 screen grid tube. The first Colpitts I have seen in the AWA tests. Very nicely done by Robert Larson, W7LNG.



Beautiful '29 push/pull Hartley Oscillator built by Harold Holden, WB2AWQ.

BY RICHARD A. PARKS

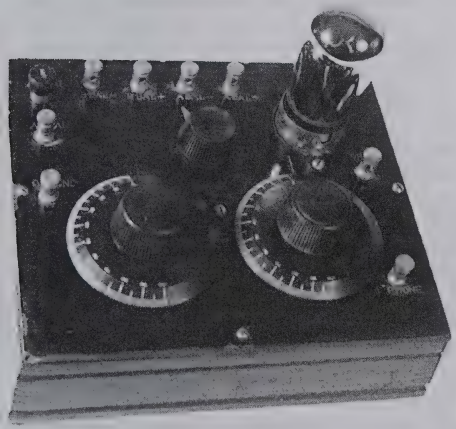
AN ABSOLUTELY ANONYMOUS ONE-TUBE RECEIVER

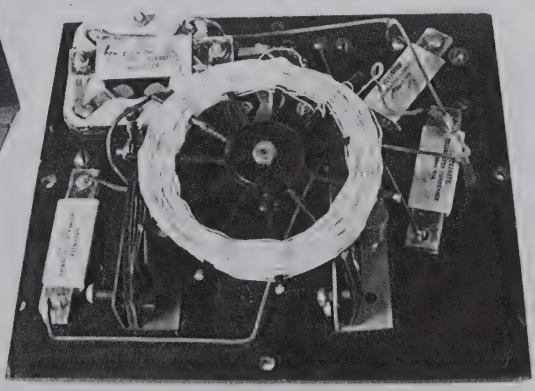
I am always a little surprised when an old radio comes back to life after sixty years or more. It happened again when a friend brought me the little set shown here. It looked to me like a one-tube kit radio from the early twenties. Looking behind the panel, I was surprised to see an eleven-legged spiderweb tuning coil and a pair of unusual mica variable condensers operated by cams—kind of like the Crosley "book" capacitors used in the models 50 and 51 receivers. The cam of each unit is insulated from the top leaf of the condenser by fish paper. And each of these caps has a "trimmer" screw that apparently can move the adjustment range of the condenser!

I'm including a photo showing how the parts are mounted back of the panel, which is a composition material like Bakelite but less well made and deteriorating a little at the edges. I also traced the circuit, which turned out to be an ordinary regenerative hookup with capacitive feedback to the tickler winding. Steinite mica capacitors were used throughout.

The set looked complete except for one of the Aerial binding posts, and there were two or three broken solder joints in the point-to-point wiring. I could not see the 2 Meg grid leak whose value was inked onto the grid condenser; it might just be a pencil line within the casing.

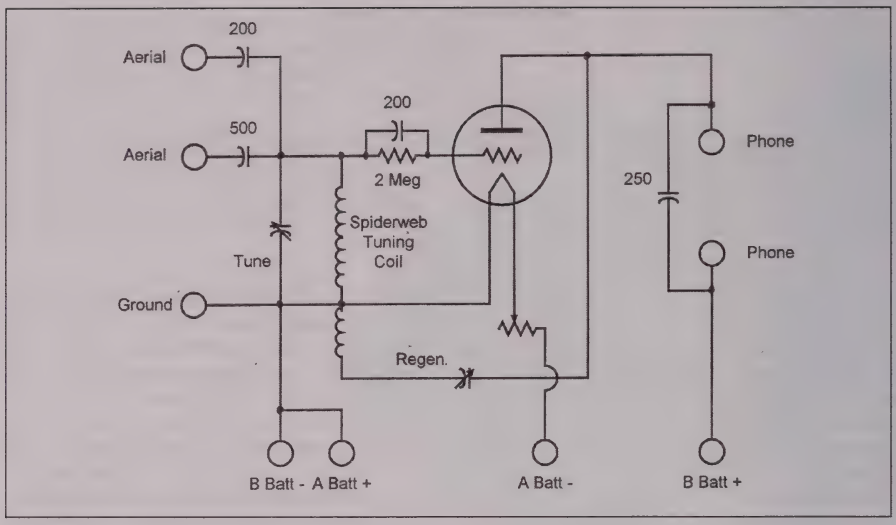
The legends for the several binding posts are stamped into the panel, leading me to think it was factory-made, and that the set might have been sold as a kit for home construction. If it was, the maker did a very nice job—with the component lugs all folded the same way around busbar wiring for added strength after soldering. However, two mounting screws omitted in mounting the variable caps are clues to me that the whole set might be a factory job. Doesn't seem like a home builder would just leave those out.





Top view of the neat little set, as well as a shot showing how the parts are mounted under the front panel.

2620 LAKE RIDGE CT., OAKTON, VA 22124



Schematic, as traced by author, is that of a conventional regenerative circuit.

But if so, why no maker's name? There are no logos on the panel, the knobs, or the bottom cover (made of cheap cardboard). The case is solid wood, with nice decorative grooves and a smooth varnish, and there are four little rubber feet that look original. I see no traces of any label on the bottom.

I fixed the bad connections and added an odd binding post in place of the missing one. When I powered up the set, using a '26 tube where probably an '01A or '00 tube should go, the set worked right away. Selectivity was good and regeneration action was smooth.

I bet the set was made about 1922—not bad reliability for hardware almost eighty years old. Anybody out there seen one of these? Has anyone any clues as to the manufacturer? For the record, the case measures seven and a half by eight and a half inches. The tube socket has no maker's name, and there is a crown molded onto the hub of the spiderweb coil. It actually looks like a piece from a checker game. Each tuning cap is marked only "pat. appl'd for." A real mystery set!

AMATEUR RADIO, *continued from page 48*

ern zone, US Districts 1, 2, 3, 4, 8, 9, plus VE1, VE2, VE3; "W" western zone, US Districts 5, 6, 7, 0 plus VE4, VE5, VE6 & VE7; "DX" zone, all others.

• *QSO points per contact by zone:* "E" to "E" or "W" to "W": 1 point; "E" to "W" or "W" to "E": 2 points; "E," "W," or "DX" to "DX": 3 points

• *Equipment Multipliers:* Mod TX and RX: 1 point; OT TX or RX: 2 points; OT TX and RX: 3 points

• *Power multipliers (input to final):* 0-4.9 watts: 4 points; 5-24.9 watts: 3 points; 25 - 100 watts: 2 points; 100+ watts 1 point

• *Determining total points per QSO:* (1) Find the QSO points for the contact. (2) QSO points X your equipment multiplier X your power multiplier = total points for the contact.

• Scoring examples: **Example 1**, W3VVS contacts W1FPZ. (a) both are in the "E" zone for 1 QSO point; (b) both have OT TX and RX for a 3 multiplier; (c) both are operating at 10 watts for a 3 multiplier. Therefore, the contact is worth $1 \times 3 \times 3 = 9$ points for each operator. **Example 2**, K6TQ contacts W2ER. (a) "W" to "E" contact for 2 QSO points; (b) K6TQ has OT RX and OT TX with 20 watts; (c) W2ER has MOD RX and OT TX running 50 watts. Therefore the contact is worth $2 \times 3 \times 3 = 18$ points for K6TQ and $2 \times 2 \times 2 = 8$ points for W2ER.

• *Awards:* Plaques will be given out at the AWA Conference in September.

• Logs: As stated above, log sheets will be sent out to previous OT contest participants and to first-time contest entrants who write to me.

About Our
Feature Article Authors

WILLIAM B. FIZETTE, W2DGB
A Structured Approach to Fixing Up Those Nice Old Radios
Part 8—Fixing up a National NC-44

Bill is AWA's current president as well as Editor of *The OTB's* "The Communications Receiver" Column. His bio appears in the February, 2000 issue.

T.J. LINDSAY
Building a 1929 State-of-the-Art Superheterodyne

Lindsay has a degree in electrical engineering, and has been a licensed radio amateur (WA9QCW) since 1965. He has also held a First Class Radio Telephone License and worked as a commercial television engineer. In the mid-70s Lindsay worked in tech support on the operating systems used in IBM mainframes for a Fortune 500 company in Chicago. In 1978, he bought his first mini-computer and launched Lindsay Publications, a publishing company specializing in reprinting old technical how-to books. These are offered via a mail order catalog to inventors, tinkerers, artists, and historians of technology.

JAMES P. RYBAK, W0KSD
Father Landell De Moura
Brazil's Wireless Telephony Pioneer

James Rybak was born in Cleveland, Ohio in 1941. He has been interested in both radio and electronics, first as a hobby and then as a profession, for over 40 years. Jim holds B.S., M.S., and Ph.D. degrees in electrical engineering as well as Extra-Class amateur radio license W0KSD. He teaches engineering and mathematics at Mesa State College in Grand Junction, Colorado. In recent years, Rybak has published numerous articles in the U.S. and abroad on the history of both wireless and electrical technology. When not writing articles, he spends his free time trying to achieve "Worked All States" through the low- earth-orbit amateur radio satellites as well as trying to become knowledgeable about digital photography and slow-scan television.

PARKS E. STEPHENSON
The Marconi Wireless Installation in the R.M.S. Titanic—Part 2

Parks is a Principal Systems Engineer at Raytheon Naval & Maritime Integrated Systems in San Diego, California. A graduate of the U.S. Naval Academy and retired naval officer, Mr. Stephenson has spent a career at sea, much of it dealing with marine communications and data links.

An avid tube-radio collector and Titanic amateur historian in his spare time, it seemed only natural for him to take on the task of researching the Marconi installation aboard the Olympic-class liners. Mr. Stephenson briefed James Cameron on the layout and equipment of the Marconi rooms prior to the film director's departure to film the documentary, "Ghosts of the Abyss," at the Titanic wreck site.

EDWARD P. SWYNAR, VE3CUI
A 1929 Amateur Radio Station for the New Millenium
Part 2—A Final Amplifier for the 1929 Hartley

Ed was first licensed as a radio amateur 30 years ago. A few years ago, he fulfilled a long-standing wish by building a 100% homebrew station based on 1960s technology. Not content with that, he later built a *second* 100% homebrew station—this time using 1929 parts and techniques. Ed belongs to ARRL and AWA. He has received many awards, including DXCC, RCC, WAS, WAC, and 5-band WAC, and has received certificates for his achievements in the ARRL DX and 160-meter contests as well as the CQ 160-meter contest.

Though his contesting days are over for now, Ed loves building OT radio and experimenting with antennas on his four acre lot. He received a bachelor's degree in Economics and History degree from The University of Western Ontario (1974), and has been with the Quality Assurance department of General Motors for some 26 years. He has been previously published in *QST* and *CQ* magazines.

SILENT KEYS

We record the passing of the following AWA member with deep regret.

GEORGE PACK (3-3-01)

Note: AWA officers and members are requested to submit all information about Silent Keys, with or without special recognition, to Joyce Peckham, Secretary, Box E, Breesport, NY 14816. This will help in the collection, coordination and appropriate recognition of both AWA members and others who have made contributions to the electronics and entertainment industries.

RECENT RADIO, TV AND ENTERTAINER OBITUARIES

COMPILED BY **CHARLES S. GRIFFEN W1GYR**
1225 NEW BRITAIN AVE., WEST HARTFORD, CT 06110-2405

Note: When known, the date of death is indicated in parenthesis.

JULIE BISHOP, 87, (8-30-01) actress. Bishop began her career in silent films while still a child, later appearing in Hal Roach comedy shorts. With the advent of sound films in 1927, she took four years off to attend school and study dance. Bishop returned to film making in 1933, appearing in *Tarzan the Fearless* with Buster Crabbe, *Alice in Wonderland* with Charlotte Henry and *The Black Cat* with Boris Karloff and Bela Lugosi. Some of her other film credits include *Tillie and Gus* with W.C. Fields (1933), *The Bohemian Girl* with Laurel & Hardy (1936) and *Rhapsody in Blue* starring Robert Alda (1945).

JERRY L. BLOCKER, JR., 70 (10-31-01) television journalist. Blocker was hired by Detroit's Channel 4, formerly WWJ(TV), in 1967. He regularly anchored the weekend newscasts until 1975, when he joined Channel 62, WGPR(TV), the first African-American-owned-and-operated TV station in the nation. Blocker retired from broadcasting in the early 1990s and established a public relations and advertising firm. He is credited with being a mentor to many black TV journalists.

EDMUND J. CAMBRIDGE, 80 (8-18-01) actor and director. Cambridge acted in more than 80 films and TV productions. This fall he completed a TV pilot called *Bernie Mac* and he appeared in the feature film *Minority Report*, shot this summer, starring Tom Cruise and directed by Steven Spielberg. Stage directing credits include *Ceremonies in Dark Old Men, Amen Corner, Two Trains Running* and *227* which later became a TV sitcom starring Marla Gibbs. Cambridge began his career as a dancer in 1946. In 1968 he was a founding member of New York City's famed Negro Ensemble Company.

JOHN ELBERT COLLINS, 83 (10-4-01) jazz guitarist. Collins was associated with Nat King Cole from 1951 until Cole died in 1965. He then went on to tour in Europe with his own group and later taught on the West Coast. He studied music with his mother, Georgia Gorham, and toured with her band from 1932-1935. Collins joined Art Tatum in 1935 and then worked with Roy Eldridge from 1936 to 1940. Later he came to New York City and was associated with Lester Young, Dizzy Gillespie, Benny Carter and Fletcher Henderson.

ERNIE COOMBS, 73 (9-18-01) children's TV host. Coombs was the star of the Canadian Broadcasting Corporation's *Mr. Dress Up*. The weekday morning show was viewed by preschoolers from 1967 to 1996. Coombs came to Canada in 1963 with Fred Rogers (*Mister Rogers' Neighborhood*), who was developing his show at the CBC. The next season, Coombs appeared in a program called *Butternut Square*, which evolved into *Mr. Dress up*. He received the Academy of Canadian Television's Earle Grey Award for TV excellence in 1994.

FRED DE CORDOVA, 90, (9-15-01) producer and director. De Cordova was the producer of NBC's *The Tonight Show*, starring Johnny Carson, from 1971 to 1984 when he was named Executive Producer. He continued as Executive Consultant when Jay Leno replaced Carson. De Cordova was the producer and director of some of the best early TV programs including *The Jack Benny Show* (CBS 1950) and *The George Burns and Gracie Allen Show* (CBS 1951). Some of his other TV credits include *December Bride, Mr. Adams and Eve, My Three Sons* and *Bewitched*. De Cordova also directed Bing Crosby's first TV special. After graduation from college in 1933, he was associated with Lee and John Schubert in many theatrical managerial and directing capacities. De Cordova also worked in Hollywood on film productions including *Bedtime for Bonzo*, starring a chimpanzee and Ronald Reagan.

TROY DONAHUE, 65 (9-2-01) actor. Donahue was a teen idol during the 1950s and 1960s. He made his film debut in *Man Afraid* (1957). His role as Sandra Dee's young lover in *A Summer Place* (1959) made him a teen matinee star. Other teen romance films include *Parrish* (1961), *Rome Adventure* (1962), *Palm Springs Weekend* (1963) and *My Blood Runs Cold* (1964). In addition, he appeared in *The Godfa-*

ther, Part II (1974). Donahue was also seen on TV in *Surfside Six* (ABC 1960-1962 and *Hawaiian Eye* (ABC 1962-1963).

GERALD GORDON, 67 (8-17-01) actor. Gordon enjoyed a long career on daytime TV in such roles as Nick Bellini on *The Doctors* (NBC) and *General Hospital* (ABC). In 1976 he won an Emmy for outstanding actor in a daytime drama special for his portrayal of Andrew Jackson in *First Ladies Diaries: Rachel Jackson* (NBC). Gordon also played the role of Dr. Felix Morger on *Highcliffe Manor* (NBC 1979) and appeared in Broadway and off Broadway shows including *Compulsion, The Private Life of the Master Race* and *The Threepenny Opera*.

JANE GREER, 76 (8-24-01) actress. Greer is probably best remembered for her menacing role opposite Robert Mitchum in RKO's *Out of the Past* (1947). Some of her other film appearances include *Station West* with Dick Powell, *The Big Steal* with Robert Mitchum and *You're in the Navy Now* with Gary Cooper, *Down Among the Sheltering Palms* and *Man of a Thousand Faces* with James Cagney. Greer also starred in many early TV shows including *Ford Theatre* and *Alfred Hitchcock Presents*. Later, she made guest appearances on *Quincy, Murder She Wrote* and *Twin Peaks*. She quit high school to begin her career as a singer with the Ralph Hawkins Band and later joined the Enric Madriguera Orchestra.

EUGENE JACKSON, 84 (10-26-01) actor. Jackson starred in the *Our Gang* comedy films of the 1920s as the character called "Pineapple." The series included *The Mysterious Mystery, The Big Town, Circus Fever, Dog Days, The Love Bug* and *Shootin' Injuns*. Hal Roach signed Jackson to a two year contract when he was 6 and gave him the name Pineapple. When the contract ended in 1926 he went to work for Mack Sennett as the only black child in the Buster Brown comedies. Jackson appeared on a number of pioneering black television shows in the 1960s and 1970s and was Uncle Lou on *Julia* (NBC) and Redd Foxx's friend on some episodes of *Sanford and Son* (NBC).

RAYMOND EDWARD JOHNSON, 90 (8-15-01) actor. Johnson was a cast member on 25 or more of the top-rated radio programs heard on network radio from the 1930s to the 1950s. A sampling includes *The Cavalcade of America; Don Winslow of the Navy; Gang Busters; First Nighter; The Guiding Light; Lights Out; Mandrake the Magician; Nick Carter, Master Detective; Tennessee Jed* and *X-Minus-One*. Johnson was also the host of *Inner Sanctum Mysteries* until early 1945.

ETTA JONES, 72 (10-16-01 jazz singer. Jones and her saxophonist partner, Houston Person, toured the country beginning in 1968. During the 1990s were appearing at international jazz festivals. She recorded with Earl "Fatha" Hines, Barney Bigard and J.C. Heard. In 1960, her LP recording of *Don't Go to Strangers* became a Top 40 hit and earned her a Grammy nomination. Jones began her career, at 16, in 1944 singing for the Buddy Johnson Band. Later she joined the *Harlemaires* and bands fronted by Barney Bigard, Pete Johnson, Earl "Fatha" Hines, J.C. Heard and Sonny Stitt.

RALPH LEVY, 81, (10-15-01) television producer-director. Levy was one of the most prominent producer-directors of television's early golden age. With the advent of live TV he joined CBS as Director of Sports at Madison Square Garden and directed such early variety programs as *The 54th Street Revue*. Later, from the newly opened CBS Television City in California, he directed Ed Wynn's 1949 TV show which pioneered live network television from the West Coast. Levy was also Jack Benny's first Executive Producer-Director and directed the original pilot for *I Love Lucy*.

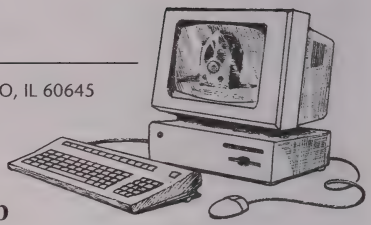
JAY LIVINGSTON, 86, (10-17-01) composer and lyricist. Livingston and Ray Evans collaborated on songs for more than 80 movies and wrote others that became jukebox hits. They won Academy Awards for *Mona Lisa, Que Sera, Sera* and *Buttons and Bows* and received nominations for *The Cat and the Canary* (1945), *Tammy* (1957), *Almost in Your Arms* (1957) and *Dear Heart* (1964). Other hits include *Golden Earrings* (1947), *To Each His Own* (1946) and *Silver Bells* (1951). The team also worked with many of the famous arrangers and composers including Percy Faith, Neal Hefti, David Rose and Sammy Cahn.

DOROTHY McGUIRE, 85, (9-13-01) actress. McGuire was a leading lady to such stars as Robert Young, Gregory Peck, Burt Lancaster and Gary Cooper from 1943 to the 1960s. Some of her film credits include *A Tree Grows in Brooklyn, The Enchanted Cottage, The Spiral Staircase, Friendly Persuasion, The Greatest Story Ever Told, Three Coins in a Fountain* and *Gentleman's Agreement*. Her big break came when she was hired to play the lead role in the stage production of *Claudia*. David O. Selznick signed her to a film contract and bought the rights to *Claudia*. McGuire later starred in the 1943 film version. Her network radio credits include *Big Sister, Joyce Jordon, MD; The Screen Director's Playhouse* and *Theatre Guild on the Air*. McGuire made TV appearances on *The Best*

(continued on page 55)

ON THE INTERNET

EDITED BY **CHUCK SCHWARK**, 7454 N. CAMPBELL AVE., CHICAGO, IL 60645
PLEASE INCLUDE SASE FOR REPLY. E-MAIL: caschwark@aol.com



Military Sets and Mil Surplus on the Web

First of all, I'd like to wish you a very Happy 2002! I hope Santa brought you some new gear or a missing piece for your collection!

Over the two long holiday weekends, I had plenty of time for wandering the web. In the process I came across the vast amount of military communications lore and military surplus sets that are available to the surfer. Not only are there sites devoted to personal collections and to buying/selling/trading, there are also many historical sites.

Below is just a quick sampling of the many "MIL" sites out there to explore. Most of them have long lists of links to related sites. Also, be sure to check out the newest links on the AWA website (www.antiquewireless.org). In addition to some of the sites below, there are others well worth your time to browse.

NSS Naval Radio Transmitting Facility Tour Page by Jim Hawkins, WA2WHV
http://hawkins.pair.com/nss.shtml
A technical discussion and tour of the NSS site coordinated by John Cummings, N3CZE, with the NSS transmitter facility staff.

Army Radio Sales Co.
http://www.armyradio.com/
Army Radio Sales website contains a wealth of free information on military radios and military vehicles, as well as on-line manuals, very interesting articles, thousands of pictures, and as a fully automated free classifieds advertising section to advertise your needs.

Wireless for the Warrior
http://home.wxs.nl/~meuls003/home.html
In this web site you will find basic technical descriptions and photographs of many vintage radio sets once used by the British Army. Also posted are numerous related subjects such as line telegraphs (the Fullerphone), air-sea rescue sets (Gibson Girl), and a gallery of Soviet radios.

The Rigpix Database
http://www.rigpix.com/index.shtml
A source of information and pictures of radios, accessories and more. Contains over 2,000 photos and specifications of receivers, transmitters, transceivers and much more. Military section has about 50 pics.

The Communications Repair Depot
http://www.commrepairdepot.com/
Specializes in Bendix King two-way LMR support with discount BK Radio sales, product information, refurbishment and repair services.

Almost All Digital Electronics' Encyclopedia of Amateur Radio Equipment
http://www.aade.com/hampedia/hampedia.htm
A giant photo encyclopedia of military and boatanchor sets.

The National Technical Information Service
http://www.ntis.gov/products/milpubs.htm
The National Technical Information Service distributes Army technical manuals (TMs), field manuals (FMs), Army regulations (ARs), technical bulletins (TBs), and other similar publications to the general public under arrangement with the U.S. Army Publishing Agency.

West Coast Military Radio Collectors Group
http://www.syzen.com/~milradio/
Since 1995, this group of collectors, restorers and users of military radios has been meeting the first weekend of May at San Luis Obispo, California. Members of the group give presentations and demonstrations of military radio equipment in the formal part of the meeting. They also have operating events and a swap meet.

The Signal Corps Museum Homepage
http://www.gordon.army.mil/museum/
The mission of the U.S. Army Signal Corps Museum and Fort Gordon is to function as a permanent historical and educational institution at Fort Gordon, providing training and education to the soldiers, military dependents at Fort Gordon and to the general public on all aspects of the history of the Signal Corps.

OBITUARIES, *continued from page 53*

of Broadway (CBS), *Little Women* (NBC 1979) and *Rich Man, Poor Man—Book 1* (ABC 1976-1977).

POLLY ROWLES, 87, (10-7-01) character actress. Rowles appeared in stage and film productions and became famous as *Inspector No.12* in a series of television commercials for Hanes underwear. During the 1930s she appeared in the films *Love Letters of a Star, Wings Over Honolulu* and *Springtime in the Rockies*. In the mid 1980s she made her final film appearances in *Power* and Alan Alda's *Sweet Liberty*. Rowles made her Broadway debut in Orson Welles' production of Shakespeare's *Julius Caesar* in 1938. Other stage credits include *Time Out for Ginger, Richard III, No Strings, Auntie Mame* and *Dark Eyes*. Rowles television appearances include *Jamie* (ABC 1953-1954), *The Defenders* (CBS 1961-1962), *Alfred Hitchcock Presents, Somerset* and *The Nurses*.

SOLOMON SAGALL, 101, (9-6-01) innovator and early advocate of pay TV. Sagall's company, Teleglobe Pay-TV Systems, had concepts that aided cable, but cable overtook him because it had the programming. He then licensed his pay-per-view technology to cable firms. His first company, Scophony, was used to broadcast sporting events to 4-foot-high television screens in London. He hoped this would make "every home a theater" with "television universities" and "news for breakfast." When Sagall came to New York City he became a leading advocate for pay TV. He hoped that charging a fee for television would result in better quality programming.

ISSAC STERN, 81, (9-22-01) violinist. Stern not only enjoyed a 60 year career as a world-renowned violinist, but helped develop and encourage young talent. He was a mentor to such artists as Itzhak Perlman, Yo-Yo Ma and Pinchas Zukerman. In addition, he assisted in the creation and preservation of the National Endowment for the Arts and helped save Carnegie Hall from destruction. Stern performed more than 200 concerts per year at his peak and was among the most recorded classical musicians in history, with more than 100 albums to his credit. He was also heard in motion pictures and television programs. Stern was President of Camegie Hall for more that four decades and spearheaded drives to save it from demolition in 1960 and to restore it in 1986. Stern first attracted national attention with his performance with the San Francisco Symphony on national radio at the age of 16.

FREDERIC ZIV, 96 (10-13-01) pioneer radio and TV syndicator. Ziv was known as the father of television syndication and for producing such series as *Bat Masterson, Sea Hunt, Highway Patrol* and *The Cisco Kid*. In 1937 he founded the first radio transcription service in Cincinnati and began packaging and distributing a radio program, *The Freshest Thing in Town,* for a local bakery. Although the show was a hit, it was too expensive for the sponsor. Ziv then decided to distribute the show nationally, and relocated his business to Chicago to produce that program and others for mass distribution. He later applied the same approach to TV and by the 1950s was the largest independent producer-distributor of TV programming in the nation. In 1959, he sold 80% of his company, Ziv TV, to Wall Street investment firms for $14 million. A year later, United Artists bought the entire company.

Information for this column was obtained from *Broadcasting and Cable, The Complete Directory to Prime Time Network TV Shows 1946-Present (4th ed.), The Encyclopedia of Jazz, The Hartford Courant, On the Air: The Encyclopedia of Old-Time Radio, The New York Times* and *Variety*. Thanks to William R. Timoszyk for additional source material.

T.J. LINDSAY

BUILDING A 1929 STATE-OF-THE-ART SUPERHETERODYNE

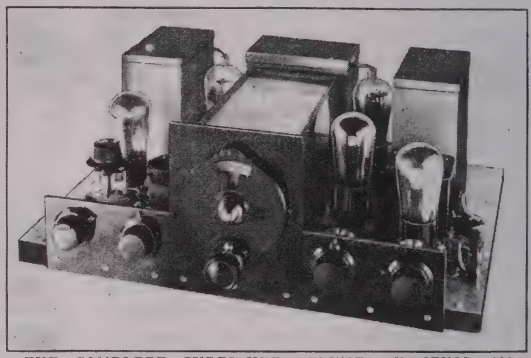
The rules for the Bruce Kelley Memorial 1929 QSO party held each December state that the transmitter must be a pre-1930 design. Although not required, why not use a pre-1930 receiver as well?

The pre-30 ham usually used a simple, low-cost, and very sensitive regenerative receiver. But I was haunted by the question of whether or not a knowledgeable and well-heeled 1929 amateur could build a superheterodyne receiver that could even come close to a "modern" design of the 1950s or 1960s. It didn't seem likely until I stumbled across the elaborate superhet detailed in the March 1929 issue of *QST*.

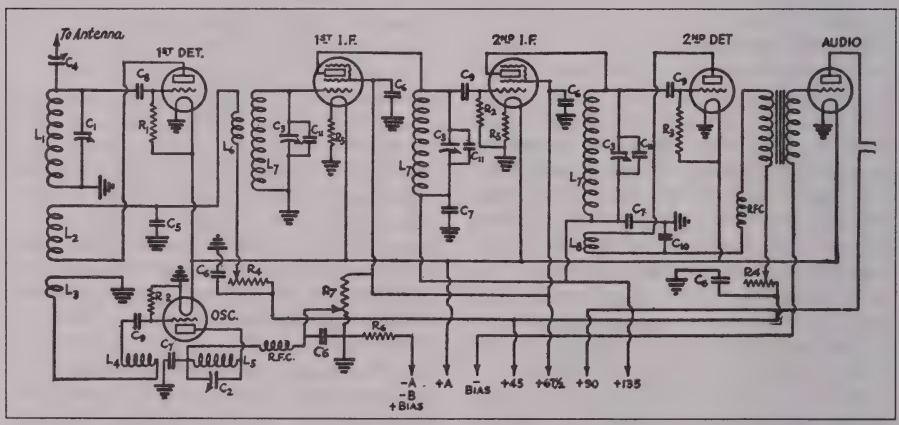
The receiver looked good mechanically, but did it work? A look at the schematic suggested that it wouldn't. The first detector, or mixer, was essentially a regenerative receiver operating at just below oscillation. Its output was amplified by a pair of tetrodes whose plates were loaded by single-tuned i.f. tank circuits. And the second detector? Another regenerative detector. The local oscillator was a conventional tuned plate inductive feedback oscillator.

At first glance, the front end looked like a disaster. Building a superhet with a grid-leak mixer was a waste of time. Such detectors are great small-signal detectors, but have very little capacity for strong signals since the tube will quickly be driven into cutoff.

But the fatal flaw results from the grid leak capacitor being required to discriminate between



THE COMPLETE SUPER-HETERODYNE AWAITING AN OPPORTUNITY TO BUCKLE UP A FEW LOUD-SPEAKER DIAPHRAMS



Schematic and photo of the superhet described in QST *for March, 1929.*

LINDSAY PUBLICATIONS, P.O. BOX 538, BRADLEY, IL 60915-0538

two different frequencies. A thousand cycle tone modulating a million cycle carrier, as is found on the AM radio bands, represents a frequency ratio of 1000 to 1. But if we want to receive an 80 meter signal on 3.6 MHz and convert it to 300 kHz, we find the ratio is only 12 to 1. A capacitor can pass one frequency and block another if the ratio is thousand to one, but not twelve to one. Neither frequency will be well accommodated. And besides, a grid-leak pair in the grid circuit seriously degrades the Q of the front end (although, here, the degradation could be overcome with the use of regeneration).

And why weren't doubly-tuned transformers for the i.f. strip available in 1929? They could have provided better selectivity. Or wasn't this known?

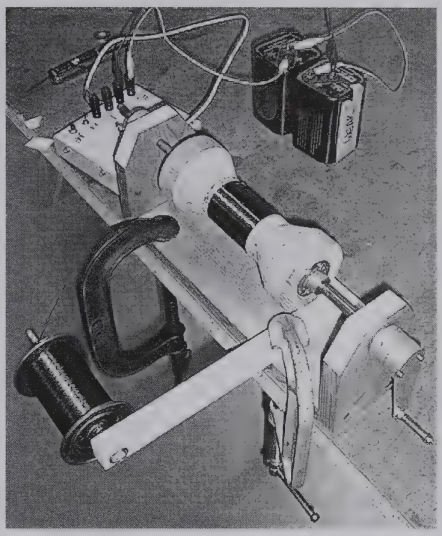
A regenerative receiver as a second detector will work adequately for CW signals, as I know from experience, but is no good for AM signals because of the frequency distortion that occurs (unless, of course, the grid-leak resistor is dramatically reduced in value). But, again, all this destroys the selectivity of the second i.f. tank circuit.

Construction of this machine just didn't look like it was even worth considering. Until... In July 1929, in the Technical Correspondence column of *QST*, an anonymous builder politely ripped the design apart stating that "One can go a step farther and say that grid detection should not be used in the second detector in a superheterodyne either, which, of course, is only a soft way of saying that it has no place at all in this type of receiver."

The author had converted his front end to plate detection and noted a dramatic increase in sensitivity and selectivity. He also pointed out that signal levels coming off the i.f. chain were far too high for the small-signal grid-leak detector. He suggested that the triode first detector be replaced with a 222 or, better yet, a 224 tetrode.

Eureka! A high-performance superhet based on 1929 state-of-the-art *was* possible, after all. A search through *QST, Experimental Wireless*, and especially the *Proceedings of the Institute of Radio Engineers* (IRE), revealed that the knowledge was almost all in place. Amateurs just hadn't adopted it yet.

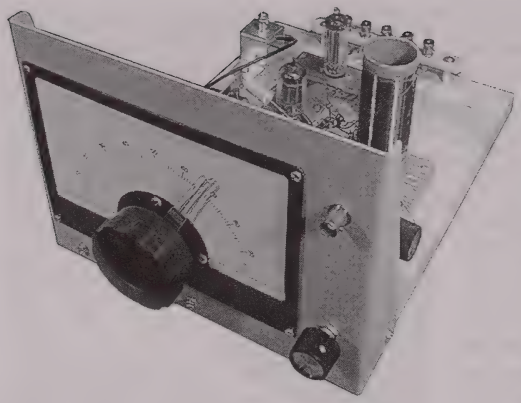
Plate detection was known early and actually reported on in the March 1927 issue of *QST*. Arguments back and forth over the merits of the grid-leak detection were published by the IRE in the late twenties. So many superhet principles had already been perfected by December 1929 that it was easier to state what *didn't* exist: injection of local oscillator signals into the cathode of the mixer was not known, nor were tapped bandspread coils or electron-coupled oscillators.



My homemade coil winder. Only unusual parts are the hardwood cones holding the coil at each end. Turns counter (upper right) is triggered by simple wiper switch.

But everything else was there: plate detection, or C-battery detection as it was sometimes called, doubly tuned transformers, i.f. regeneration (Q multiplier), BFO circuits, even serious experiments in AGC circuits despite the fact that the type 35 variable-mu, or super-control, tetrode had yet to be marketed. So I decided to build a superhet. The first hurdle was the selectivity of the i.f. strip. Could a solenoid coil tuned to 300 kHz have a high enough Q to deliver passable selectivity? Calculations using a spreadsheet version of Nagaoka's pre-WWI inductance calculations showed that 300 turns of #33 enameled copper wire on a 1¾" cardboard tube would yield about 2.1 mH. If the winding-to-winding capacitance was not excessive, the coil should have a self-resonant frequency above 300 kHz.

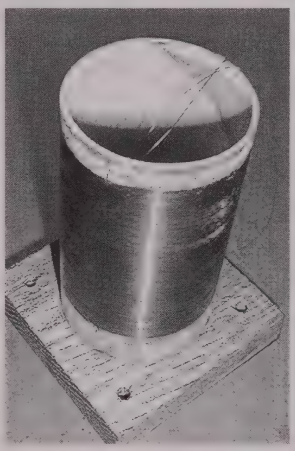
If you've ever tried to wind a solenoid of many turns with very fine wire, you know that it's next to impossible. Forty-five turns into the coil, you break the wire. Or it gets jumbled. Or a kink really messes up the winding. I needed to build a coil winder. It was another detour to be sure, but a detour that gave me another valuable radio building tool. With the coil winder, 287 turns (300 was the target) went on in a flash! It was amazing. No broken wires. No endless profanity. No beating my head against the wall. There it was—a solenoid. But would it work?



Simple breadboard Colpitts oscillator was built to provide signals in 300 kHz range for testing i.f. transformers.

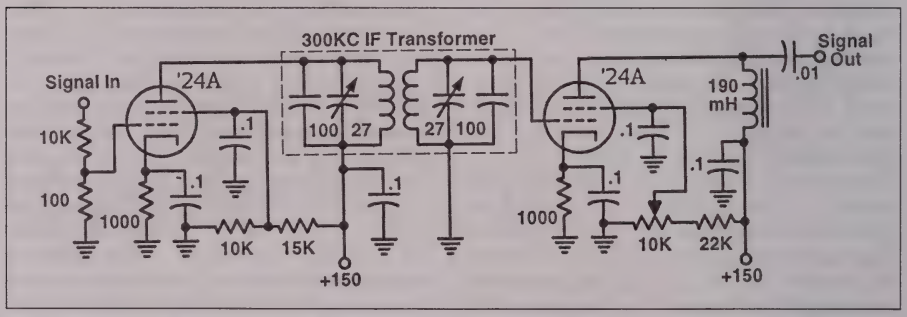
It was obvious that the coil could be put on 300 kHz with a bit more capacitance. But it was also obvious that my test oscillator tuned far too rapidly. The tiniest rotation of the frequency control would send it speeding by the frequency of interest. So another tool had to be built. This time I needed a very slow-tuning signal generator that could deliver a steady signal from about 295 kHz to 305 kHz. Another detour? Well, I saw it as an opportunity to build another valuable test instrument. I had an old breadboard with a National ACN dial drive. Using this as a foundation, I built a simple Colpitts oscillator with a cathode-follower output using a 12AU7. A dual 365-pF broadcast capacitor served as the "bandset condenser," but a 140-pF capacitor driven by the dial drive provided padding across one section. This configuration yielded an oscillator that would tune from about 295 to 305 kHz over a 180-degree rotation of the ACN drive.

I have no grid-dip meter that will tune 300 kHz, so I had to find another way to measure the resonant frequency. After putting a small mica capacitor in parallel with the coil, I loosely coupled it to a 20 Hz-2 MHz signal generator. Nearby, another large coil was connected to the probe of my calibrated oscilloscope (an amplified diode detector would do as well). As I tuned the oscillator, I watched the trace grow larger and larger. With a 47 pF capacitor a peak occurred at 391 kHz according to the frequency counter also connected to the generator. Adding another 27 pF, for a total of 74 pF, across the solenoid moved the peak to 338 kHz.



Completed i.f. transformer solenoid (see text) was sealed with varnish. Inductance was about 2.1 mH; DC resistance 33 ohms.

The new test oscillator was lightly coupled to the solenoid, which was put in parallel with a 100 pF capacitor. The resonant frequency was about 250 kHz, and frequencies of 248.1 and 253.7 gave voltages that were 71% of the resonant voltage. These are the 3 dB or half-power points. Subtracting the two frequencies yielded 5.6 kHz which when divided into 250 kHz gave a Q of about 45. That was low probably because



I.f. transformer test circuit (see text). Output from 300-kHz signal generator was fed in; signal out was fed to calibrated oscilloscope in order to measure voltage.

of loading. The actual Q was probably higher.

The next step was to wind another coil, and to mount the pair in an aluminum box so I could measure the transformer Q while in circuit. A type 24A was cathode biased, and the primary winding was put in the plate circuit. The secondary winding was fed to another 24A loaded by a 190 mH choke. The choke was so large that there was little danger of regenerative feedback that would artificially increase the i.f. transformer Q.

After resonating the windings to a signal near 300 kHz, the 3 dB frequencies were measured at 298.2 and 301.5. That gives a geometric mean resonant frequency of 299.8 kHz which in turn yields a Q of about 91. By varying the size of the hole in the partition dividing the i.f. transformer compartments it was possible to change the coupling from over to under. In this initial test, overall voltage gain was measured as 103. There was no doubt, now, that a selective superhet could be built with homemade i.f. transformers and 1929 technology.

The Circuit

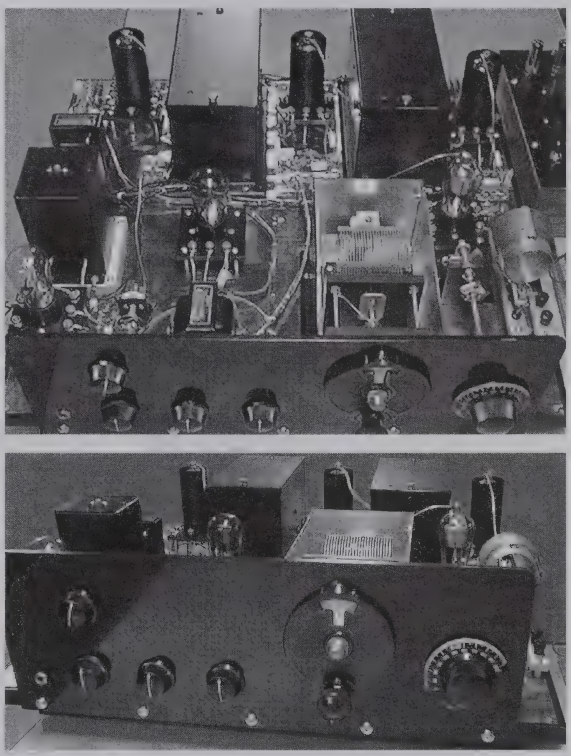
Although it may have been novel in 1929, my final superhet circuit is almost obvious today. A tank circuit tuned to 80 meters feeds the grid of the 24A first detector (or mixer), on the plate of which hangs the first 300 kHz i.f. transformer as a load. Screen grid voltage is derived from the B+ supply with a simple voltage divider. A resistor from cathode to ground, bypassed for rf, brings the cathode above ground to provide bias for the grid which is connected to ground through the tank circuit.

In 1929, putting resistors and bypass capacitors in the cathode of each tube would have been expensive. More likely the cathodes would have been grounded, with grid bias provided by the power supply, or from C batteries. As can be seen, this detector is not a grid leak, but a plate detector (or C battery detector).

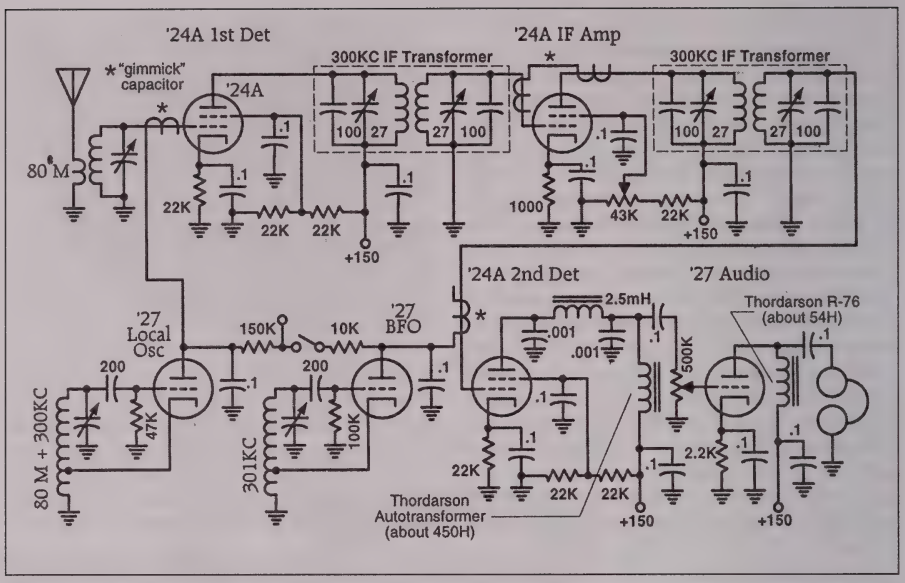
A Type 27 triode in a Hartley oscillator circuit provides a signal 300 kHz above the CW portion of the 80 meter band, so that when mixed with the incoming signal, the proper intermediate frequency will be developed. Since I didn't have an early small-value variable capacitor such as a Pilot, I decided to make one from threaded rod and aluminum and phenolic plates.

A homemade spacewound coil with appropriate tap, and the capacitor, were mounted inside an aluminum box to provide shielding and thermal isolation. The shaft of the capacitor protrudes far enough through the box to pass through the ¼" phenolic front panel and into a National Type B dial drive. Signal is put on the grid of the mixer by wrapping a wire from the oscillator plate around the detector grid lead to create a "gimmick" capacitor.

The 24A i.f. amplifier provides additional gain and selectivity at 300 kHz. In the screen grid supply circuit, a 43 k pot (an off-the-wall value from the junk box) was installed to provide some control over gain. Then one end of a wire was slipped between the tube and the shield, and the other end was wrapped around the grid lead. By adjusting the number of turns, the tube could



Two views of the completed 1929 superheterodyne. Tubes in cans at rear are (l.to r.) second detector, regenerative i.f. stage, first mixer. BFO coil is in box at left center of board with BFO oscillator tube just below it. Audio amplifier is at right of BFO box. Local oscillator tube is at right center of board.



Schematic of the superheterodyne. The type 27 local oscillator has since been upgraded to a type 24-A.

be driven into oscillation with the pot providing maximum screen voltage. Rotating the pot counterclockwise reduces the screen voltage, reducing gain, so that regeneration can be carefully controlled. This simple arrangement provides significant "Q" multiplication giving enhanced selectivity and somewhat better gain.

The second detector is just another plate detector with a pi-network low-pass filter in the plate circuit to prevent r.f. from getting into the audio stage. The load on the 24A is a 20s vintage Thordarson autotransformer with about 450 henries of inductance. This high value is needed to adequately load the high plate resistance of tetrodes and pentodes.

A beat frequency oscillator almost identical to the local oscillator delivers a 301 kHz signal to the second detector through another gimmick capacitor. A small variable capacitor across the BFO coil (wound just like the i.f. coils but having a series of feedback taps near the ground end) allows changing the frequency about 2 kHz either side of zero beat. A switch in the plate lead allows the BFO to be switched off for reception of AM signals.

From off the top of the autotransformer, the audio flows through a capacitor into a 500 k pot which provides both volume control and bias to the 27A triode audio amplifier. The plate load is provided by a 1920s Thordarson R-76 transformer with the primary and secondary connected in series so that the transformer becomes a choke with dramatically increased inductance, in this case, about 54 henries. Plenty of load for the 10 k triode plate resistance.

Construction

Chassis construction had appeared by late 1929, but I wanted to use breadboard construction. Not having enough breadboard-mount 5-prong sockets for the project, I decided to make special socket mounts. 3"×3" squares were cut from ¼" thick pine, and a 1¼"-diameter hole was drilled in the middle of each square using a common spade bit. After mounting a chassis-style socket to the underside of each one, the squares were mounted about an inch off the breadboard with standoffs cut from ¼"-diameter steel brake line. Five brass screws with knurled thumbnuts were mounted in holes around the edge of the wooden square to allow connection of the tube to the circuit.

It was obvious that the 24As would have to be shielded to prevent feedback and unwanted oscillation. I decided to fabricate four identical shields from steel sheet metal. To do this requires a slip roll: a three-roller device that can turn flat sheet metal into a cylinder. The sheet metal was cut, rolled into a cylinder, soldered along the seam, and mounting brackets attached. All shields were sprayed with satin black to aid in heat dissipation.

Two kiln-dried finished pine boards from a

local home-improvement chain were glued and fastened to a base of 1×2s to provide a 22"× 24" breadboard. To create a ground plane, I tacked on two overlapping sheets of the copper foil commonly used in craft work. I had reasoned that using kiln dried lumber would give the breadboard dimensional stability. That was a bad assumption! Within three months, the board had shrunk enough so that the copper sheet looked like a washboard.

The front panel is ¼" canvas phenolic, available from industrial suppliers like Grainger or McMaster-Carr. As supplied, the phenolic sheet is glossy and a natural tan color. After roughing up the surface with fine sandpaper, I covered all sides with glossy spray paint. After three coats of paint, the face plate was wet sanded with 400 wet-dry paper, and then given a couple of more coats. Finally, several coats of paste wax brought the panel up to a beautiful satin sheen.

Performance

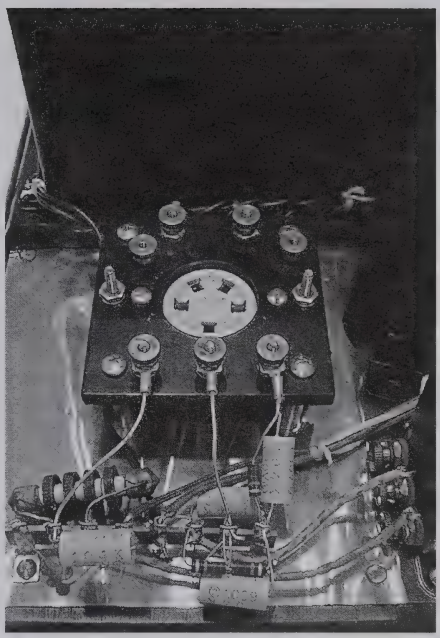
One short session with this table-top monster is all that is needed to understand why amateurs wanted to shelve the regenerative in favor of superhets. Stability is superb because the tank circuit is "built like a tank," shielded, and kept cool. Also, the power supply is regulated at 150 volts. Yes, you can say regulated voltage is cheating, but in 1929 you probably would have used a battery on the local oscillator plate and unregulated B+ on the other plates. So overall stability would have been just as good.

Selectivity? With careful adjustment of the i.f. regeneration control, the selectivity gets sharper and sharper until a code signal is heard almost to exclusion of all others. This Q multiplication would not be effective if the local oscillator weren't as stable as it is. The small homemade variable capacitor and the National dial drive provide all the bandspread I could want. No regenerative receiver I've ever used could come close.

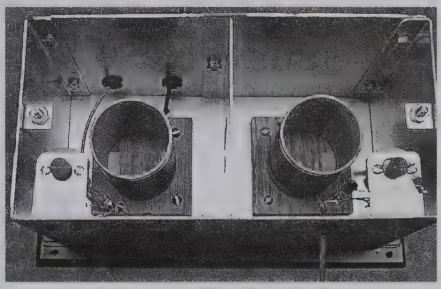
Gain? Quite adequate. A bit more audio gain would be desirable, but perhaps my used type 27A audio amplifier tube is tired. Perhaps another i.f. stage is called for.

Problems

"Pulling" is problem. As the antenna tank circuit on the grid of the first mixer is tuned, the local oscillator changes frequency slightly. This unwanted connection between tank circuits has always been a problem and is to be expected here. The local oscillator has already been upgraded to a 1931-era electron-coupled oscillator using a 24A in the same Hartley configuration. This has dramatically reduced pulling.



Tube sockets are mounted on pine panels elevated above baseboard with standoffs. Connections are made to tube pins via knurled thumbnuts. This is the second detector stage.



I.f. transformer with top removed. The partition is there to prevent massive overcoupling of these large coils, which would destroy selectivity. A 1" hole in the partition allows proper amount of coupling.

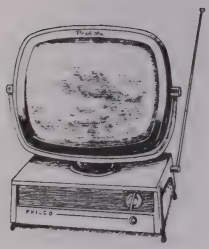
The gimmick capacitor on the i.f. amplifier providing Q multiplication is temperamental and needs frequent adjustment. Perhaps a small variable capacitor in a different circuit configuration would more be stable in the long run.

And there is some AC hum in the audio. Not

(continued on page 65)

TELEVISION

EDITED BY **RICHARD BREWSTER**, 145 LITTLE PECONIC BAY ROAD, CUTCHOGUE, NY 11935 *PLEASE INCLUDE SASE FOR REPLY.*



Ken McIntosh — TV Historian

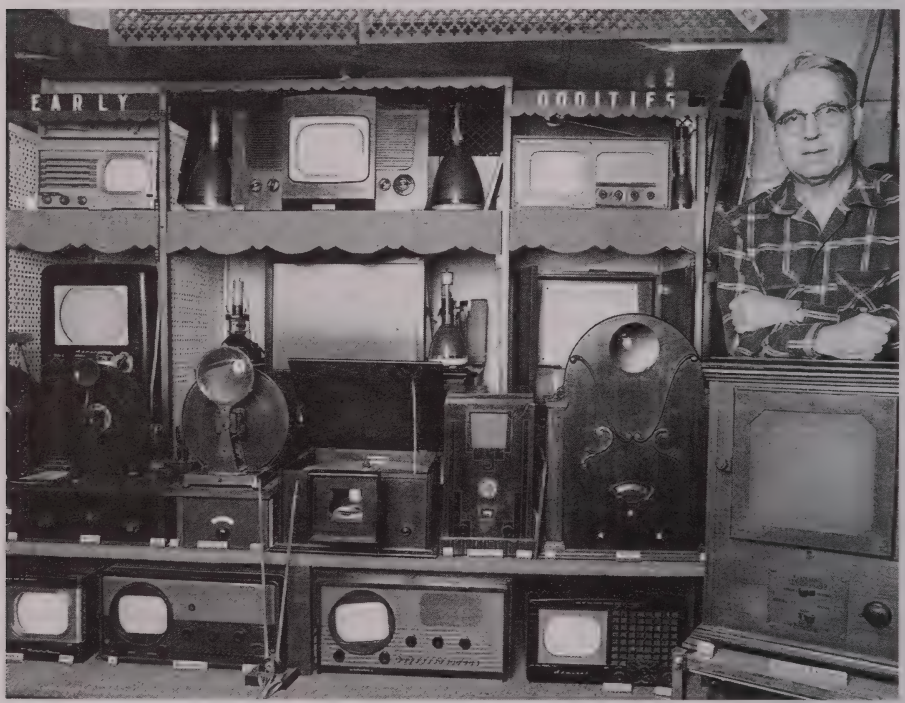
Kenneth L. McIntosh died last July 31st. He had been ill for some time and was 93 at the time of his death. Somehow his obituary didn't make it into the *OTB* at the time and the following is an attempt to rectify that oversight.

Ken began to acquire examples of historic televisions in the mid 70s, long before most of us thought of TV as a collectable. He was born in Erie, PA and served in the Air Force in the Pacific during World War II. After his discharge in 1945, he worked as a budget analyst for the Army and Air Force Exchange Service until his retirement in 1970. Shortly before his retirement, he took a course in TV servicing and got hooked on the old stuff.

Ken had quite a significant collection of early sets, which he lovingly restored. They ranged from the mechanical sets of the late 20s to the first solid-state portables of the 70s. He also experimented with the live transmission of images to his mechanical sets, sometimes using a rare Felix the Cat doll, the star of early TV!

Although his collection was private, Ken entertained many visitors, some from as far away as Japan. But his biggest coup occurred in 1989, when he agreed to provide a number of examples of his early TV sets to the Smithsonian's National Museum of American History for its

(continued on page 65)



Kennneth McIntosh with part of his private collection. Photo by Carleton Sarver.

NEW BOOKS AND LITERATURE

EDITED BY **DAVID W. KRAEUTER**, 506 E. WHEELING ST., WASHINGTON, PA 15301 E-MAIL kraeuter@sgi.net
PLEASE INCLUDE SASE FOR REPLY.

Books to be reviewed in this column should be sent directly to David Kraeuter at the address above. After review, all books become a permanent part of The AWA Library, which is located in The AWA Electronic Communication Museum and is open to members for browsing and research.

Tickling the Crystal: Domestic British Crystal Sets of the 1920s

By Ian L. Sanders. Photography by Carl Glover. Published 2001 by Bentomel Publications, Tunbridge Wells, UK, E-mail BentomelBooks@aol.com, 8½ by 12 inches, 256 pages, hardcover, £29.95.

Many of us had a crystal set, toy or otherwise, as a child, but be warned—this book may well produce a major change in the lives of those who approach it thinking they are no longer interested in such things.

The glossy, heavy paper used in the book for benefit of the photography gives it a heft that hints at a corresponding quality of content. In this readers and viewers will not be disappointed.

The first thing noticed is the high quality of the photographs, beginning with the striking picture of a Brownie No. 2 crystal set with tube amplifier on the front cover. Those contemplating writing their own illustrated book would do well to note the equipment and computer programs Glover used to produce the virtually flawless photos here. About 200 are included, some in color.

The text is on a par with the photos. Sanders obviously has wide experience with British crystal sets and their history. He put ten years into the research for this book, and that work is evident on every page. He devotes a chapter each to the crystal set era (about 1922 to 1928), General Post-Office registration, manufacturers, circuits, detectors, aerials and earths, headphones, cabinets, novelty sets, note magnifiers (amplifiers), hybrid (crystal/tube) receivers and the home construction of sets.

The bulk of the book consists of chapter 13, "Pictorial Dictionary of Crystal Sets." The description accompanying each illustrated set details manufacturer, model, year, construction, tuning and detector types, original price and other information.

Occasionally some interpretation from the British idiom is necessary. A prominently-featured 1926 quote by BBC Chief Engineer P. P. Eckersley advises crystal set users whose reception is unacceptable: "...get a valve set or double your aerial, or look to your earth...." The American reader will translate this to: "... get a tube set or raise or lengthen your long-wire, or check your ground connection...." An interesting note about antennas I've seen nowhere else: it is suggested that the height of a long-wire should not exceed 60 feet, "since this would require too much of the total length being consumed by the down-lead portion."

About 20 pages of appendixes include a directory of manufacturers (complete with original addresses!), GPO registration numbers, brands of crystals, a list of crystals and minerals, note magnifiers, headphone models, and circuit diagrams. Two indexes—general and model name/number—are included, another indication of the thought and work that went into the production of this volume. As anyone who has ever prepared an index for a book knows, the work is tedious and time-consuming, and the publisher wants the text *right now*.

From cover to cover, this book is first class.

♦ ♦ ♦ ♦

History of Telegraphy

By Ken Beauchamp. (IEE History of Technology Series 26). Published 2001 by Institution of Electrical Engineers, Michael Faraday House, Six Hills Way, Stevenage, Herts. SG1 2AY, UK. Email jsears@iee.org.uk. 6¼ by 9½ inches, 413 pages, hardcover, $95.00.

It is sad that Beauchamp (1923-1999) did not live to see his beautiful book published. But he did complete the text and choose the illustrations for this detailed history of the most useful device invented in early information technology. Beauchamp held a Ph.D in signal processing and retired as the Director of Computing at the University of Lancaster (UK) in 1985.

To establish a baseline Beauchamp begins with a short chapter on telegraphy's visual predecessor, semaphores. This in itself is a fascinating subject. Russian Tsar Nicholas I estab-

lished a system of semaphores stretching from St. Petersburg to Warsaw. It was staffed by 1,320 personnel and its 220 stations were strung across 600 miles. Interestingly, both semaphore systems and wired telegraphy, including submarine cable, were used in the Crimean War.

The remainder of the book is divided into two equal parts—terrestrial (wired) and aerial (wireless) telegraphy. Beauchamp describes some early telegraphy schemes that never caught on. One was Samuel Sommerring's military electrochemical telegraph. The receiver consisted of a cable terminating in 35 gold points submerged in a tank of water. Each point represented a number or letter. The device was read when electrolysis produced a stream of bubbles above the appropriate point.

One of the "subplots" of wired telegraphy is submarine cable. Some interesting wrinkles of submarine telegraphy revealed by the book are:

• The corrosive nature of sea water required the use of a particular type of insulation for submarine cables. This turned out to be gutta-percha, the same stuff that was packed into your tooth the last time you had a root canal. The substance comes from the percha trees of southeast Asia. The use of gutta-percha by the submarine cable industry resulted in the deforestation of large areas of southern Malaya and Singapore in the mid 1800s.

• Because of the electrical characteristics of a long submarine cable (it can be seen as a large capacitor), a dot and a dash used in "cable code" are of the same time duration, the distinction between dots and dashes being made instead by a change of signal polarity.

• In time of war, cable ships repaired submarine cables deliberately damaged by the enemy, or better yet, spliced enemy cables into the cables of their own nation, thus neatly turning them from enemy cables into friendly cables.

• The 6,600 mile long cable between Australia and Canada was completed in 1902, years before electronic amplification was available. Fears that the cable was too long for practical use — that "No signals would come out at the other end!" — proved to be unwarranted.

Of equal interest are these wrinkles from the world of wireless telegraphy:

• Installation of telegraphy in aircraft during World War I increased the target accuracy of artillery sixfold.

• Marconi proposed a long wave wireless system, the World-Wide Imperial Wireless Scheme, to link the entire British Empire in the early 1920s. Marconi's employee, Charles S. Franklin, was experimenting at the time with short waves. In the nick of time, Marconi changed his proposal to incorporate short waves and the resulting system was highly successful. In Marconi's book *50 Years of Wireless* he included quotes that the change to short waves resulted in reductions to 1/50 the power and 1/20 the cost of his original projections.

Evolution, it is said, has operated without purpose for millennia to produce the living world we know today. Has telegraphy and 19th century technology in a similar manner produced the information technology world we know today? Beauchamp ends his book thus: "The remarkable developments in 'communication at a distance,' commencing with the invention of the telegraph in the eighteenth century, can clearly be recognized as leading directly to the present equally remarkable growth in digital global communications — the wheel of technology has indeed turned full circle!"

♦ ♦ ♦ ♦

An Historical Sketch of Henry's Contribution to the Electromagnetic Telegraph

By William B. Taylor. Published 1879 by the U.S. Government Printing Office, out of print. Also in ***Smithsonian Report for 1878****, pp. 262-360. Reprinted in George Shiers'* ***Electric Telegraph: An Historical Anthology****, Arno Press, 1979, $59.95. This, and most other books reviewed in this column, are available through the Interlibrary Loan Service of your local public library.*

When did Samuel F. B. Morse invent the electric telegraph, and who invented it before him? One can learn a lot trying to answer this cockeyed question. Anyone who seriously tries to do so will sooner or later arrive at Taylor's fascinating publication with the unwieldy title of *An Historical Sketch of Henry's Contribution to the ElectroMagnetic Telegraph: with an account of the origin and development of Prof Morse's invention.*

In 100 detailed pages Taylor recounts the history of the telegraph, beginning by quoting Robert Sabine: "The electric telegraph had properly speaking, *no inventor.* It grew up little by little, each inventor adding his little to advance it toward perfection."[1]

For the telegraph to be invented, it had first to be imagined. Here Taylor quotes a charming 17th century dreamer: "Among the numerous flights of imagination by which genius has frequently anticipated the achievements of her more deliberate and cautious sister—earth-walking reason, none is perhaps more striking than the romantic conception by Famianus Strada, of Rome, in the early part of the seventeenth cen-

tury, of an intercourse maintained between separated friends by means of two sympathetic magnetic compasses, whereby the indications on the dial given by one, were instantly made visible to the other."[2]

Taylor goes on to describe the many efforts that preceded Morse's, Wheatstone's and Cooke's commercially successful telegraphs. He begins with Lesage's telegraph of 1774: "The first electric telegraph of which there is record, is that established at Geneva by Georges-Louis Lesage. The line consisted of 24 insulated wires for the alphabet, each terminating in a pith-ball electroscope duly lettered, for indicating by its excitement the succession forming the words and sentences given by the operator, who employed at the transmitting station a manual conductor from an electrical machine."

Taylor finally gets around to describing Morse's efforts of half a century later, but first goes into detail about the telegraphs of M. Lomond (1787), M. Reiser (1794), Tiberius Cavallo (1795), D. F. Salva (1798), Dr. Samuel Thomas von Soemmering (1808), Dr. John R. Coxe (1816), Francis Ronalds (1816), Andre Ampere (1820), Paul Schilling (1823), Peter Barlow (1824), Harrison Gray Dyar of Long Island, NY (1828), Victor Triboallet de Saint Amand (1828), Gustav Fechner (1829), Dr. William Ritchie (1830), Carl Gauss and Wilhelm Weber (1833), and Professor C. A. Steinheil (1836). Only then are Morse's later "relay" and "receiving" circuits covered. Along the way Taylor credits Galvani, Volta, Oersted, Sturgeon and, most of all, Joseph Henry for their contributions to the science of telegraphy.

In addition to providing lots of detail and insight into the background of telegraphy — including the famous "disagreement" between Morse and Henry — the booklet unintentionally gives a thorough lesson in the potential pitfalls that await the naive researcher who sets out to determine a "first" in the history of invention.

NOTES

1. *The Electric Telegraph.* Robert Sabine. London, 1867, part i, chap. iv, sect. 39, p. 40.
2. *Prolusiones Academicae.* F. Strada, quarto, Rome, 1617, lib. ii, prolusio 6.

[This review originally appeared in The Pittsburgh Oscillator, *Volume 15, Number 2, June 2000, pages 5-6.]*

SUPERHETERODYNE, *continued from page 61*

serious, but still noticeable. It's not from the B+ supply. Most likely the problem results from the fact the connections from the second detector to the volume control, and then to the triode grid, were not shielded (though these wires *were* kept close to the copper ground plane).

This simple six-tube superhet using, primarily, state of the art as of December, 1929, will pull in almost anything a modern receiver can. That includes those 10 watt transmitters participating in the Bruce Kelley QSO party a thousand miles away. It may look complicated, but is not. If you can build a regenerative, then you certainly can build a superhet like this!

TELEVISION, *continued from page 62*

exhibition, "Television From the Fair to the Home 1939-1989."

For three years, starting in 1984, Ken published *Antique Television Topics*, possibly the first publication devoted exclusively to the antique TV hobby. It was issued quarterly to as many as 45 subscribers, free of charge. Each photocopied issue contained as many as 11 hand-typed pages and included photos and sketches developed by Ken from his research.

He also prepared several monographs, including "The Evolution of Television," "Who really Invented Television?" and "Cabinet Comparisons for Collectors."

A long-time member of AWA, Ken regularly attended our annual conferences and entered the old equipment contests. He was one of the first recipients of the Taylor Award for the documentation of television history.

We all mourn his loss. Ken's wife, Helen, a sister, three stepchildren, eight grandchildren, and three great-grandchildren, survive him.

NOTE: I am seeking material for future TV columns. Don't be afraid to send suggestions that are just in the idea stage. I will provide the writing and/or editing and submit for your approval prior to publishing.—RB

BY JAMES P. RYBAK, W0KSD

FATHER LANDELL DE MOURA: BRAZIL'S WIRELESS TELEPHONY PIONEER

The serious experimentation with wireless telegraphy and telephony being conducted at the end of the nineteenth century was not limited to the industrially developed nations of Europe and North America. Efforts to develop wireless communications systems sometimes took place in what then might have seemed to be unlikely places.

The work of a Brazilian priest by the name of Roberto Landell De Moura is an example. Father Landell, as he preferred to be called, reportedly began his attempt to develop wireless telephony in 1893 [1]. Marconi did not learn of Hertz's work, and become inspired by it to begin developing a system of wireless telegraphy, until the following year.

Since Fr. Landell was a priest, time and funds for experimental work were quite limited and his work proceeded slowly. However, through his ministry, he knew some people who were able to provide him with a modest amount of money to purchase needed parts and equipment.

There is little authoritative information about Fr. Landell's early work. But it is known that he publicly demonstrated his wireless equipment in Sao Paulo, Brazil on June 3, 1900. Reports of this event indicate that he transmitted voice messages over a distance of approximately 8 km.

The demonstration was witnessed by members of the press as well as C. P. Lupton, who was the British government Consul in Sao Paulo. It is likely that Fr. Landell had been introduced to the British Consul by one of his influential Brazilian supporters. This public demonstration was reported a week later in the newspaper "Jornal do Comercio." Some individuals claim that fragmentary reports of Landell De Moura's preliminary work and demonstrations had been published a few years earlier in several Brazilian newspapers [1].

However, neither Fr. Landell's ecclesiastical superiors nor the Brazilian government really supported his work, so progress was slow. In addition, his lack of access to scientific journals kept him uninformed concerning the work others were doing and further delayed his progress.

Following this 1900 public demonstration, Landell de Moura applied for a Brazilian patent on his equipment. The equipment was described in the patent application as being capable of providing "Distance Phonetic Transmission with, or without the use of wires, through space, and aqueous elements" [2, 3]. It is important to note that his initial apparatus utilized light waves, and not radio waves, for communicating by voice.

Several sources state (or at least imply) that the Brazilian patent (No. 3279) which Fr. Landell received on his communication system was awarded on March 9, 1901 [1, 2, 3]. However, an examination of the patent document suggests that this was actually the date on which Fr. Landell's patent application was completed by his attorney.

The possible commercial value of his work and the fact that a Brazilian patent provided uncertain protection were obvious to Fr. Landell. Shortly after applying for his Brazilian patent, he

Roberto Landell de Moura. (From the web site http://www.geocities.com/Athens/Olympus/4133/english.htm)

AUTHOR'S ADDRESS: MESA STATE COLLEGE, GRAND JUNCTION, CO 81501

went to New York City where he took up temporary residence for the purpose of applying for U.S. patents. In New york, he also refined his equipment and studied the current literature on wireless communications.

In October of 1901, Fr. Landell applied for a U.S. patent on what he now simply called his "wireless telephone." This circuit was basically the same as that on which he had received his Brazilian patent. He filed a second U.S. patent application in January of 1902 on a "wireless telegraph" and a third, filed in February of 1903, on a "wave transmitter." Patents 775337, 775846 and 771917, respectively, were awarded to him for these devices in October and November of 1904.

The evolution of Landell De Moura's thoughts concerning wireless telephone communication technology is interesting. It is clearly reflected in his U.S. patent applications. His initial proposal that wireless telephone communication take place using light waves, rather than radio waves, is surprising.

In the first U.S. patent application filed by De Moura, the priest described how a voice signal would modulate the light produced by an arc discharge or a Crookes tube. Radio waves were used only to signal the distant person by that a telephone transmission was about to occur [4].

The second U.S. patent application emphasized that Landell's communication equipment could also be used as a stand-alone wireless *telegraphy* station employing either optical or radio waves. The telegraph key was used to control both a Hertzian wave generator and a Crookes tube discharge. Even in the event that only radio wave wireless telegraphy was wanted, Fr. Landell maintained that the ultraviolet-rich light from the Crookes tube should be focused in the same direction as the electromagnetic waves. He believed that the ultraviolet light would "facilitate the propagation of the Hertzian waves" [5].

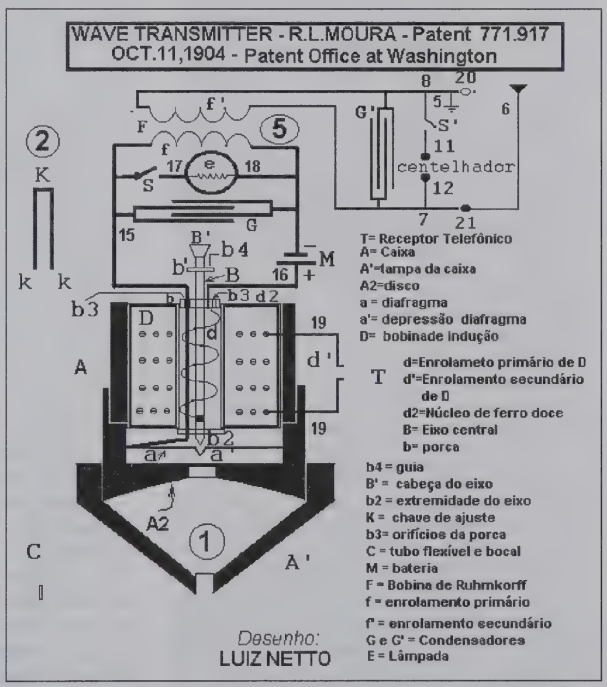
In his third U.S. patent application, Landell De Moura finally seems to have realized that non-optical electromagnetic waves were far superior to light waves as the medium for transmitting voice messages. He eliminated almost all of the optical communication features of his wireless telephony system, while making modifications and improvements to the Hertzian wave circuitry. Provisions for modulating a light source were included, but the emphasis was now on wireless telephony communication using Hertzian waves [6].

The circuit associated with Landell De Moura's third, and final, U.S. patent application ("wave transmitter") is shown in the accompanying figure. It has been redrawn from that patent application and has some of the notations in Portuguese [7].

The following explanation of Fr. Landell's "wave transmitter" is taken from the text of the actual patent application [6]. The microphone and modulator portions of De Moura's circuit are depicted in the lower portion of the drawing. De Moura referred to this as his "phonetic switch."

The person using the wave transmitter spoke into the mouthpiece **C**. The acoustic waves produced by the person were coupled to the resonant

(continued on page 69)



Circuit redrawn from Fr. De Moura's third U.S. patent description with legends in Portuguese. See text for explanation. (From the web site http://www.geocities.com/Athens/Olympus/4133/english.htm)

AWA Electronic Communication Museum
Statement of Activities

NOVEMBER 2000 THROUGH OCTOBER 2001

Ordinary Income/Expense	
Income	
6000M . DONATIONS FROM CLUB	126,389.12
6010M . MUSEUM STORE INCOME	251.00
6806M . CD ROM PROJECT	9,342.50
6007M . MISCELLANEOUS INCOME— MUSEUM	64.20
6020M . INT ON BANK ACCOUNTS—MUSEUM	2,371.75
6024M . AWA PUBLICATION INDEXES	143.00
6025M . DISPLAY ADS IN OTB—MUSEUM	550.00
6027M . DIVIDENDS—MUSEUM	229.48
6030M . AUCTION PROCEEDS	262.40
6031M . DEACCESSIONS—SALES	575.00
6036M . CONTRIBUTIONS—MUSEUM	1,911.00
6038M . SURPLUS SALES, GENERAL	27.00
6039M . SPRING MEET INCOME	2,530.76
6040M . CONFERENCE FLEA MARKET SALES	416.00
6041M . OLD CONF. OTB/REVIEW BK SALES	134.00
6070 . SURPLUS EQUIPMENT SALES	34.00
6802M . OLD OTB & REVIEW SALES	8,013.86
Total Income	153,245.07
Cost of Goods Sold	
8107M . COST—AWA REVIEW 6 SOLD	62.00
8108M . COST—AWA REVIEW 7 SOLD	155.00
8109M . COST—AWA REVIEW 8 SOLD	111.00
8111M . COST—AWA REVIEW 9 SOLD	741.00
8112M . COST—AWA REVIEW 10 SOLD	61.25
8113M . COST—AWA REVIEW 11 SOLD	697.00
8114M . COST—AWA REVIEW 12 SOLD	4,133.00
Total COGS	5,960.25
Gross Profit	147,284.82
Expense	
8028M . MUSEUM STORE EXPENSES	485.00
8116M . LEGAL FEES	542.99
8001M . Bank Service Charge	196.90
8014M . COMPUTER SUPPLIES—MUSEUM	186.00
8022M . DEPR. ON ANNEX	3,411.12
8025M . MUSEUM SUPPLIES	547.35
8026M . MUSEUM BEAUTIFICATION	800.00
8027M . MUSEUM RENT	1,000.00
8030M . INSURANCE-FINE ARTS COLLECTION	5,301.00
8031M . INSURANCE—FIRE, THEFT—MUS,ANN.	969.07
8032M . DEPR. ON COMPUTER	528.36
8033M . INSURANCE—OFF. & DIR. LIAB	360.00
8060M . GENERAL POSTAGE	441.81
8061M . GROUNDS KEEPING	200.00
8062M . GAS	964.84
8063M . ELECTRICITY	1,495.75
8064M . WASTE WATER SERVICE	200.00
8065M . OFFICE SUPPLIES	355.45
8067M . ACCOUNTING	883.00
8072M . ARTIFACT PURCHASE FUND	20.00
8073M . LIBRARY BOOKS	32.00
8074M . LOCAL CONTRIBUTIONS BY MUSEUM	260.00
8075M . ALARM SYSTEM	207.02
8090M . SPRING MEET EXPENSES	880.00
8115M . ADVERTISING AND PHOTOGRAPHY	628.17
8130M . VOLUNTEER APPRECIATION	736.93
8155M . WATER	56.00
8160M . TELEPHONE	1,108.83
8165M . EBAY FEES	3.57
8167M . OTB & REVIEW SALE SUPPLIES	255.00
8168M . OTB & REVIEW SALE POSTAGE	781.71
8191M . MISC. EXP.—MUSEUM	42.18
Total Expense	23,880.05
Net Ordinary Income	123,404.77
Net Income	123,404.77

AWA Electronic Communication Museum
Balance Sheet

AS OF OCTOBER 31, 2001

ASSETS	
Current Assets	
Checking/Savings	
1080 . HSBC CKING -MUSEUM	33,957.33
Total Checking/Savings	33,957.33
Other Current Assets	
Certificates of Deposit	
1115M . FLEET 24 MONTH CD	15,287.30
1057M . CITIBANK 36 MONTH CD	33,615.42
1111M . ESL 36 MONTH CD	65,506.85
1104M . ESL MONEYMAKER ACCT.	74,666.20
1042 . ESL MONEY MARKET—MUSEUM	7,209.08
1043 . ESL MONEY MARKET RESTR.—MUSEUM	3,971.09
1108 . ESL—30 MO. CERT.—MUSEUM	21,089.48
Total Certificates of Deposit	221,345.42
1400 . PREPAID EXPENSES	
1406 . PREPAID RENT	166.67
Total 1400 . PREPAID EXPENSES	166.67
1600 . INVENTORY	
1622 . AWA REVIEW 14	10,970.43
1621 . AWA REVIEW 13	4,934.43
1618. AWA REVIEW 10	2,265.75
1616. AWA REVIEW 8	596.00
1615. AWA REVIEW 7	711.00
1614. AWA REVIEW 6	562.00
Total 1600—INVENTORY	20,039.61
1330M . BANK ACCT.INTEREST	2,363.57
Total Other Current Assets	243,915.27
Total Current Assets	277,872.60
Fixed Assets	
2400 . LEASEHOLD IMPROVEMENTS	5,386.38
2405 . STORAGE BUILDING	88,549.02
2450 . DEPR. RES ON STORAGE BUILDING	-37,323.90
2499 . DEPR. ON ELECTRONIC COMM. MUSEU	-5,386.38
2500 . LAND—LEGION PROPERTY	16,562.89
2510 . COMPUTER EQUIPMENT	2,641.98
2545 . DEPR. RES. ON COMPUTER EQUIPMEN	-1,584.74
Total Fixed Assets	68,845.25
TOTAL ASSETS	346,717.85
LIABILITIES & EQUITY	
Equity	
3900 . NET ASSETS	223,313.08
Net Income	123,404.77
Total Equity	346,717.85
TOTAL LIABILITIES & EQUITY	346,717.85

MUSEUM NEWS, *continued from page 14*

As we approach the event, there will be more details on the AWA Web site.

The new *AWA Review* 14, featuring the most authoritative information on spark keys, is selling well. If Santa missed that on your want List, you can order it. or perhaps a new AWA lapel pin, and some of those wonderful CD ROM research tools via the order blank on the last page. I'm out of room for this issue. Please do give me or your Trustees some feedback and suggestions, or just a note on how we're doing with the administration of your museum.

Ed Gable K2MP/W2AN, *Curator*

RECENT MUSEUM DONORS *(compiled December 29, 2001)*

Joseph Battoglia
Philco 40-125 Remote Controlled Console

Norm Litsche (estate)
Two TV7D/U tube testers 1000 tubes

Ginny Schroeder
Tube Salesman's Display case, Raytheon, Rare

William Kelly
Misc Heath Test items, Zenith Royal 1000

Ronald Johnson, WA2ABL
Complete line of Heath SB Ham equipment, fine

Robert Cordaro
Rocket Xtal radio, vintage

William Johnston, K5ZI
Varian VDS-1023, new

James Troe
Bell Labs Transistor Radio, First Cell Phone

Bernard Logan
AK-40 with type E speaker

Doug Magin
Wilcox CW-3 receiver, Kolster B eliminator

David Hoffman K2ONP
TRIO 9R95DS receiver, predecessor to Kenwood

John Rundall
Heath Williamson type hifi system

Tom Peterson, Jr.
Nice French Display of Receiving Xtals, books

Nelson Smith (estate),
WE205D Meyers audion + socket, 17 more

Richard Kessler, K2SZE
Scientific Radio Systems SR-206 100W Xcvr

Mark Olson
Heath SB-630 Console

Ed Gable K2MP
Rocket Xtal radio, late version

Eric Hauptmann
RTTY Baudot mechanical QBF Generator

Thomas Perera W1TP
Two early & rare Morse Registers

DE MOURA, *continued from page 67*

chamber **1** by a flexible tube, where they were directed toward and impinged upon the diaphragm **a**. The sound waves caused the diaphragm to vibrate which, in turn, caused contacts **a'** and **b2** to open and close at a rate determined by the frequency of these waves.

The opening and closing of the contacts caused dc current pulses to flow at an audio frequency rate from the battery **M** through the primary winding of the phonetic switch's induction coil **D**. The voltage produced by the secondary winding of this coil was applied to the primary winding of the Ruhmkorff coil **F**. The result was that the signal radiated by the antenna **6** consisted of a series radio frequency pulses flowing at an audio frequency rate. Alternatively, closing switch **S** effectively short-circuited the primary winding of the Ruhmkorff coil and caused the dc current pulses to flow through the light **e** when optical communication was desired.

Father Landell De Moura clearly realized that it was impossible to adjust the diaphragm contacts **a'** and **b2** so that all the harmonics associated with the speech would be produced. He believed, however, that the positive opening and closing of the switch contacts resulted in better overall operation of his circuit than if he had used a variable resistance microphone.

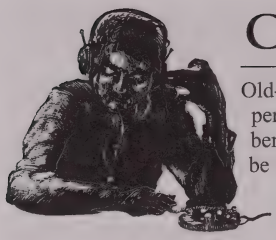
When receiving wireless telephone messages, De Moura's apparatus worked in reverse. Switches (not shown) were thrown to cause the received signal to flow through the primary winding of the phonetic switch's induction coil. The received signal, consisting of pulses occurring at an audio frequency rate, then caused pulses of current at the same audio frequency rate to flow through and produce sound in the telephone receiver **T**.

There is no evidence that Fr. Landell De Moura ever found anyone interested in buying his patents and/or manufacturing the equipment he had designed. The optically based communication equipment described in his Brazilian patent and first U.S. patent suffered from many of the same shortcomings exhibited by Alexander Graham Bell's "photophone" some twenty years earlier.

By the time De Moura's third U.S. patent had been awarded, Reginald Fessenden and others had demonstrated that continuous wave (CW) radio signals were far superior for wireless telephony purposes than were the spark-gap generated signals which Fr. Landell's system used. Nonetheless, His work has justifiably earned for him an important place in the annals of wireless telephony history.

REFERENCES

1. "Priest Roberto Landell De Moura—A Brazilian is one of the pioneers of worldwide radio broadcasting." http://www.qsl.net/lmdxc/lm27.htm
2. "Meet the Man Who Pressed the Button of Communications—His Works and Struggles." http://rlandell.tripod.com/english.htm
3. "Father Landell—Brazilian Patent." http://www.geocities.com/Athens/Olympus/4133/english.htm
4. United States Patent No. 775337.
5. United States Patent No. 775846
6. United States Patent No. 771917.
7. "WaveTransmitter." http://ww.geocities.com/Athens/Olympus/4133/EnglishWavTrans.htm



CLASSIFIED ADS

Old-time ads are free to members collecting and restoring equipment for personal use. Please observe the following: (1) one ad per issue per member; (2) include a SASE if acknowledgement is desired; (3) material must be more than 25 years old and related to electronic communications; (4) give your full name, address and zip code; (5) repeats require another notice (we are not organized to repeat automatically); (6) the AWA is not responsible for any transaction; (7) we retain the right to reduce an ad's size if over seven lines; (8) AWA does not accept commercial advertising in this column; and (9) closing date is six weeks prior to first day of month of issue. Ads received after that time will be held for the following issue. Mail all ads to: **RICHARD RANSLEY, P.O. BOX 41, SODUS, NY 14551**.

IMPORTANT!

OTB classified ads are now available for browsing in the "*OTB On Line Edition*" on our internet web site (www.antiquewireless.org). This practice will give members dramatically increased exposure for their ads.

SELL/TRADE—BC/SW TUBE RADIOS

I'm getting out! Start or add to your collection. 21+ nice old table radios. Most work fine, some restored. Assorted parts also, $120 or BO (pick up only). For photos send SASE to Henry Seesselberg, 22 Christy Drive, Warren, NJ 07059 or E-mail:HSEELLELBERG.MTOO@worldnet.att.net

SELL/TRADE—COMMUNICATIONS GEAR

Early HRO with engraved rack type panel, 4 coil sets, $400.; HRO-60 with freq. meter and FM options, 5 coil sets, $450.; NC-173 with speaker, $225.; early NC-101X with speaker , extra fine, $300.; SX-25 with base reflex console cabinet and coaxial speakers, like new. All receivers are looking and fine working. Other radios, including consoles, pick-up only. Malcolm Burdick, W1NOD, 156 Station Rd., Hampton, CT 06247 (860) 455-9640 before 8:00 p.m.

National NC303 in good condition, with book, $250. Will deliver/meet within 100 miles of Wellsboro. Bill Plimpton, W2IXT, RR6, Box 264, Wellsboro, PA 16901

National decimal velvet vernier 4" dial, 5 to 1 ratio planetary drive, type "N" in mint condition, $15.; National 7" dial, same as used on HRO and 101 receiver. Complete with gear box. One slight mark on dial, otherwise in mint condition, $25.; plug-in octal socket coils, polystryene forms, overall size 3" long, 1" diameter. Sprayed with light gray Krylon, $1.25 each. All plus shipping. Don Swanson, 8070 Briaroak Dr., Pensacola, FL 32514-7830

SELL/TRADE—GENERAL

Mallory VP555 Vibrapack, 6V input, 300V at 200 ma output, $30.; prop pitch rotator, $30.; 1935 Ford Philco auto radio, $125. Bill Beckett, 6 Wax Myrtle Lane, Hilton Head, SC 29926 (843) 837-2435 E-mail: wbeccath@hargray.com

Antique electric light bulbs, over 25. Some over 100 years old with Thomson-Huston bases. Will sell individually for best offer. SASE for illustrated list with description. Herman Fothe, 5292 Tiffany Ann, West Palm Beach, FL 33417

Metz 404WF, $75., Newcomb E-10A amp., with two Turner mikes, $50., Sony R-R TC-352D with two Sony NIB F-98 cardioid mikes, $80., both plus shipping. Want Philco 37-630 chassis, clean and complete. Robert Rossi, 10936 Melbourne St., Allen Park, MI 48101

Operadio Model 7, fair condition, $275. or B.O.; Majestic Treasure Chest, fair, $290. Spark transmitter panel 3' by 5', 1 inch thick hard bakelite, $125. or best offer. Telephone and telegraph collection including firehouse and railroad relays, pickup only. Paul Recupero, 265 Union St., Portsmouth, RI 02871-2264

"Radio Bank" Ideal Toy Co., $45., Vani-toneVanity Fair Children's Phono, Model 700, 78 rpm, new in box, $85., Allied Radio 1958 catalog, $22., 1953, $22., Radio Amateur's Handbook, 1958, $20., RadioCraft magazines, 19 issues from the 1940s, $75. All plus postage. Richard C. Moore, 82 Chicago

Rd., Oswego, IL 60543 (630) 551-3682

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125 table, tube radios (kitchen & bedroom) of 1945-1970 era. Parts to build 20 different transmitters, transformers (power, plate, filament, audio) coils, switches, fans, blowers, sockets, diodes, capacitors (air, oil, mica, electrolytic), meters, 50 ohm loads, turns counters, chassis, panels and cabinets. Also have TV-Radio Service - 20 instruments with 90 large drawers of parts, catalogs and manuals. Digital photos available via E-mail. Francis H. Yonker, PE, W2IBH, 1229 Inverary Place, State College, PA 16801 E-mail: yonker 1229@home.com

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Antique Radio Garage Sale. Estate of Ted Babcock. More old radio stuff than at many antique radio meets, with over 600 individually priced items. Consoles, cathedrals, tombstones, plastic sets, novelties, floor cone speakers, horn speakers, 1923/24 *Radio News*, 1920s *Wireless Age*, RCA Red books, many Riders manuals, boxes of early radio knobs, 30 boxes of tubes, IF, Power & audio transformers, dial lights, condensers, Stromberg Carlson radio & parts, Crosley, Zenith & much more. Two car garage and museum are filled. 10am-5pm, 16 & 17 March 2002 (Sat. and Sun.). 497 Long Island Drive, Moneta, Virginia. 20 miles ESE of Roanoke. From Moneta take Rt. 122 west, cross bridge over lake & proceed west on Rt. 122 about 2 miles to Rt. 951 (Red Bud Lane). Follow signs. Second right on Red Bud Lane is Long Island Drive. See you there! No list. No early birds. (540) 721-1222 or (716) 741-3082 E-mail: dotlarryb@aol.com

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Jensen Type H coaxial 15" speaker, $50.; DX-300 6 band receiver w/manual, needs work, $25.; telegraph sounder Pat_d 1875, $40.; horn drivers 2 ea. Baldwin Type C and Songbird adjustable, both w/cords, $25. both; Weston Industrial Circuit Tester Model 785 w/manual, HV adapter, leads, $75.; RCA 2AP1 CRT, $8.; variable grid leak _ to 15 megohms w/mount, $10.; misc. Hammarlund, Pilot, etc. variable condensers; misc. Readrite meters. Misc. DC filament rheostats.; misc. 1920/30s phone jacks, knobs, etc. C. F. Bauer, 1707 Guldahl Dr., Titusville, FL 32780 (321) 268-0916

Have the following chassis for sale, some working and some non-working: Philco #19, works, $35.; Zenith #10S669 (10B1 chassis), $60.; Philco #38-620, $45.; Philco #38-620 (similar to previous), $30.; Philco #500, $65.; Atwater Kent Type P, $50.; Grunow #460, $30. Want information & schematic for Federal #200 panel radio. Walt Wrabek, 10750 159th Ave., Menahga, MN 56464 (218) 564-4623

Philco Model 48-2500 Tilt Mirror television. George Rancourt, 82 White Loaf Rd., southampton, MA 01073

EICO Cortina series FM tuner. Factory built, no instructions. Small holes on side. Also Lafayette Stereo-10 solid state amplifier with instructions. John Uscinowski, KE2O, 95 Vly Summit Rd., Greenwich, NY 12834-9519

Vintage RCA amplifier, PP245/26 and 80 nom, Type 245 amp Ser. No. 18922X. Chassis all brass, painted brown. Item works and defective parts have been replaced. Tubes are original, balloon glass. Also have a vintage Philco floor Model 39-40. All defective parts and bad wiring replaced, all tubes good or new. Cabinet refinished including brass work, sounds very good. Make an offer for both or singly. Carl Watson, P.O. box 114, Boothbay, ME 04537 (207) 633-3828

SELL/TRADE—LITERATURE

AWA Review Volume 13. $10. postpaid. Ken Greenberg, 4858 Lee, Skokie, IL 60077 (847) 679-8641 between 1 and 5 p.m.

Radio Call Books, Radio Listener's Guide & Radio Review, 15 issues, reduced to $175. for 35 issues. Floyd Paul, 1545 Raymond Ave., Glendale, CA 91201 (818) 242-8961

Antique radio schematics plus data still only $3. postpaid. Communication receivers $5. postpaid. Joseph Forth, 321 Long Vue Acres, Wheeling, WV 26003 E-mail: wa2trt@att.net

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Books: Vintage Radio, Radio Collectors Guide, A Flick of the Switch. All by McMahon. All three for $25. Andrew Toross, 425 Old Country Rd., Orange, CT 06477 (203) 795-4523

Federal Tel & Tel, 64 page booklet. Describes Federal Radios from the beginning in 1921 to the end in 1929. Over 60 illustrations including pictures of early Federal RF and audio amplifiers as well as all of the earliest radios. Many Federal parts are pictured and described. The article and speech by Dick Schamberger, the Federal expert, are included. All Federal radio models are listed

with the year and month introduced, cost new and description. The Federal broadcast station, WGR, first in Buffalo is described. There are two pages of references for more Federal information. This book contains more Federal Radio information than exists in any other publication. Good quality printing. $8.95 (including S & H) to Larry Babcock, 8095 Centre Lane, East Amherst, NY 14051 Email: dotlarryb@aol.com

SELL/TRADE—PARTS

Fresh stock of high voltage, long lead CAPACITORS ideal for tube radios. 10% off 1st purchase with copy of this ad. For product info write or phone Dave Cantelon, 42 Clematis Rd., North York, Ontario, Canada M2J 4X2 (416) 502-9128 or visit web site: www.justradios.com

Attention Zenith TV restorers - ca 1950s. I have 22 new replacement parts NIB including carrying caddy, excellent condition, $10. per item, or take the lot, caddy and all for $200. Carl Watson, POB 114, Boothbay, ME 04537 (207) 633-3828 anytime up to 10pm EST

Older parts, tubes, books. Two stamp SASE or e-mail for list. Wayne Letourneau, PO Box 62, Wannaska, MN 56761 E-mail:W0cte@arrl.net

SELL/TRADE—TEST GEAR

Boonton Model 190-A "Q" Meter, 20 to 260 mHz, excellent condition, with manual, $175. + S&H. Leonard Gardner, 458 Two Mile Creek Rd., Tonawanda, NY 14159 E-mail: radiolen@.com

SELL/TRADE—TUBES & TRANSISTORS

Trade my NIB RCA 6AD6/6AF6 (15) & 6JS6 (3) for your NIB 6U5/6E5 & 01A tubes. Also available is an AK480, AK30 and AK55C, all recapped and working. A. Bruno, 24 Butternut Dr., New City, NY 10956 (843) 354-8899

Vacuum tubes. 245 new and 483 used. From number OA2 to 9003. Complete listing available. Sell complete or in parts. For information or offers, write to G. J. Glaser, 215 Warren Ave., Rochester, NY 14618-4315 or E-mail: giglaser@netacc.net

WANTED—COMMUNICATIONS GEAR

NC-120 in good working order and appearance and AL-4 for Drake SW4-A. Anthony Capobianco, 20 Landing Road, Glen Cove, NY 11542 E-mail: dr.capobianco@mindspring.com

WANTED—GENERAL

Fisher Radio Spacexpander (reverb). Working preferred, NG also OK. Charles Graham, 4 Fieldwood Drive, Bedford Hills, NY 10507 (914) 666-4523 anytime

U.S. Park Service radios, any model or condition, especially a "PTR-2" set. Typical manufacturers include Spokane Radio, Radio Specialty, Technical Radio Co., Radio Laboratories Inc. Northern Radio, or Kaar Engineering. Have classic communications gear and telegraph keys to trade or cash. Rick Ferranti, WA6NCX, 1341 Cedar Street, San Carlos, CA 94070-4755 (650) 859-2857 or E-mail: remler@juno.com

Western Electric 639 microphone; pre-WWII TV set, Jerry Talbott, 1440 SW 239th Ave., Hillsboro, OR 97122-7640 (503) 649-6717 or E-mail: jerry@easystreet.com

Mopar truck radio, 611-T or 610-T, schematics, radio and/or knobs. Or substitute (metal) knobs from any American radio from the 1950s. Also looking for trim covers for Telefunken "Bajazzo" radio from the late 1960s. These cover the screw attaching the handle, and the antenna opening (2 sizes). Ron Zammit, 3841 Santa Domingo, Arroyo Grande, CA 93420 (805) 489-5724

Want to buy 1940s TV sets, and Dynascan 1000 or 1050 TV Analyst. Charles Harper, 2000 Jackstown Road, Paris, KY 40361 (859) 484-9393 E-mail: charper@kyk.net

Stromberg-Carlson 403-AA or similar "A" and "B" power supply, built 1927, working or not. David Kaiser, 375 Yarmouth Road, Rochester, NY 14610 (716) 654-6604 E-mail: ddk375@frontiernet.net

WANTED—INFORMATION

A photo of a four-legged console cabinet made by Sewell Runyon for Atwater Kent. Need photos of leg construction for restoration. Alton DuBois, Jr., 67 Peggy Ann Road, Queensbury, NY 12804 (518) 792-3130

Clough-Brengle info wanted: Need references to

(continued on page 74)

BUSINESS CARD ADS

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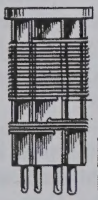

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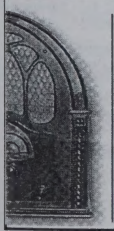

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CLASSIFIED ADS, *continued from page 72*

company history, catalogs and manuals. Colugh-Brengle manuals needed for models CR-A Oscilloscope, 110 HF signal generator, 280 BFO and 111 "Frequency Modulator." C-B equipment wanted: Model 111 Frequency Modulator. Have some C-B manuals and equipment available for trade. Any help appreciated. Don Merz, N3RHT, 47 Hazel Drive, Mt. Lebanon, PA 15228 E-mail: Merz.ds@mellon.com

WANTED—KEY & TELEGRAPH

Unusual telegraph gear such as camelback keys from before 1870, large spark era keys especially oil break types, and oddball bugs (speed keys) from obscure manufacturers or weird configurations like vertical, left-handed, right angle or dual pendulum. Gil Schlehman, K9WDY, 335 Indianapolis St., Downers Grove, IL 60515 (630) 968-2320

WANTED—LITERATURE

Service manuals/schematics for Grundig, Blaupunkt and Telefunken (no Photofacts please). Also looking for complete set of Sams Hi-Fi (MHF) manuals. Dave Cantelon, 42 Clematis Rd., North York, Ontario, Canada M2J 4X2

Information on Mengel Radio Co. and Type M.R. 101 Receiver; Instructions for H-P Model 120A Oscilloscope; CD/Info Royal Canadian Air Force Comm. Receiver Type GR-10 (RCA Model AR-77). George B. Clemans, 851 W. Wooster, Bowling Green, OH 43402 (419) 352-7198 E-mail: clemans@bgnet.bgsu.edu

Radio News, Radio-TV News, Radio Craft, Radio Electronics 1938-1965, CQ 1945 to 1947. Richard Petersen, 1940 Grand Ave., Marion, IA 52302 (319) 377-9126

WANTED—MILITARY

Military equipment manuals for ASB-5 radar, OE-4/GR antenna group, GRA-94 antenna group, PRR-15 receiver, PPS-15B radar, TRN-25 Beacon Transmitter. William Van Lennep, P.O. Box 211, Pepperell, MA 01463 (978) 433-6031

WANTED—PARTS

An audio transformer pack for an AK 55-C. I need it to restore the set. Alton A. DuBois, Jr., 67 Peggy Ann Road, Queensbury, NY 12804 (518) 792-3130

Radio chassis and clock for Lyric Wurlitzer Model S-6 grandfather clock radio. Anything that will fit and nonworking OK. James Fisher, RR1, Box 861, Port Royal, PA 17082 (717) 527-2224 E-mail: yrless@tricountyi.net

Good CRT for Tektronix Tube 317 oscilloscope. Any reasonable price OK. Would consider salvage scope or a working one to get this CRT. John T. Kaetz, Jr. 6841 Chesser Rd., Bessemer, AL 35023 (205) 491-2933

Front panel of Hallicrafters SX-42. Also any model of McLaughlin Signal Splitter. Gary Cain, 850 Marschall Rd., #102, Shakopee, MN 55379 (952) 496-3794 E-mail: k7adf@aol.com

Audio transformers for either Grebe CR-9 and/or -12; Zenith Model 103 (1933) hi-boy console; Zenith 1R, 2M or 3R battery sets. Thanks. Chris Hicks, 57 Jameson Hill Road, Clinton Corners, NY 12514 (845) 266-4257 E-mail: hicksriley@earthlink.net

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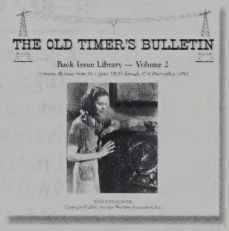

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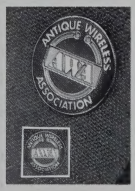

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